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SMALL–SCALE INDUSTRY GRANT

BASE LINE DATA – KOREA PROGRAM AREAS

Grant Period: January 10, 1974 to January 9, 1975

A PROGRAM FUNDED BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

B-426

Project ~~A-1600~~

BASE LINE DATA

REPUBLIC OF KOREA AND AREAS SERVED BY SOONG JUN UNIVERSITY

Compiled by

Industrial Development Division
Engineering Experiment Station

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332

January 1975

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BACKGROUND AND INTRODUCTION

Republic of Korea

The Republic of Korea (ROK), with a land area of approximately 34,427 square miles (about the size of Indiana), has a population in excess of 33 million. The capital city of Seoul has over six million inhabitants.

Recovery from the civil war of the 1950's was slow until the mid 1960's. Since 1965, the annual growth of the gross national product (GNP) is considered to be one of the highest in the world. Estimates for growth of GNP for the year of 1973 range from 13% to 17%. This rapid growth, however, has not been uniform throughout all sectors of Korea, leaving some pockets of under-industrialization and high unemployment.

Soong Jun University

Soong Sil College was founded in Pyeng Yang, Korea, in 1912. It was closed for political reasons in 1938 and reopened in Seoul in 1954.

In 1970, Soong Sil merged with the Taejon Presbyterian College, founded in 1946 by the Southern Presbyterian Mission, and became Soong Jun University. Campuses of the university are now located in Seoul (enrollment of approximately 1,500) and in Taejon (enrollment of slightly more than 650).

To better serve the needs of the nation and to get technology to the point of practical application, it was decided in 1972 to form on each campus an industrial development assistance program to concentrate on the less developed pockets in the areas near the two campuses.

Industrial Development Assistance

Dr. Hahn Been Lee, president of Soong Jun University, heads the Integrated Development Center (IDC) at Seoul and the Regional Development Institute (RDI) at Taejon. The operating heads, who are full-time faculty on campus, are Dr. Yoon Bae Ouh at Seoul and Mr. Byong Hae Lee at Taejon. They are assisted by a committee, also full-time faculty, on each campus.

The criteria used for selection of the assistance areas were the following:

- o Underdeveloped
- o Under-industrialized
- o Low income region
- o High unemployment

The areas near the two campuses that best fit these criteria were Yeong Deung Po and Kwanak, south of Seoul, and Yun Kee Kun and Tae Duck Kun, surrounding and to the north of the city of Taejon. (See Map 1.)

It was further decided the assistance provided should be concentrated on small-scale industries, which was described by Soong Jun University as employment of 200 or less and capitalization of up to $125,000.

The nature of the assistance to be provided by Soong Jun University to the participants will be concerned primarily with, but not necessarily restricted to the following:

- o Research and gathering of pertinent data
- o Seminars and specialized forums
- o Industry-University interchange and building of relations
- o Industrial extension services providing technical and managerial assistance
- o Industrial training and education

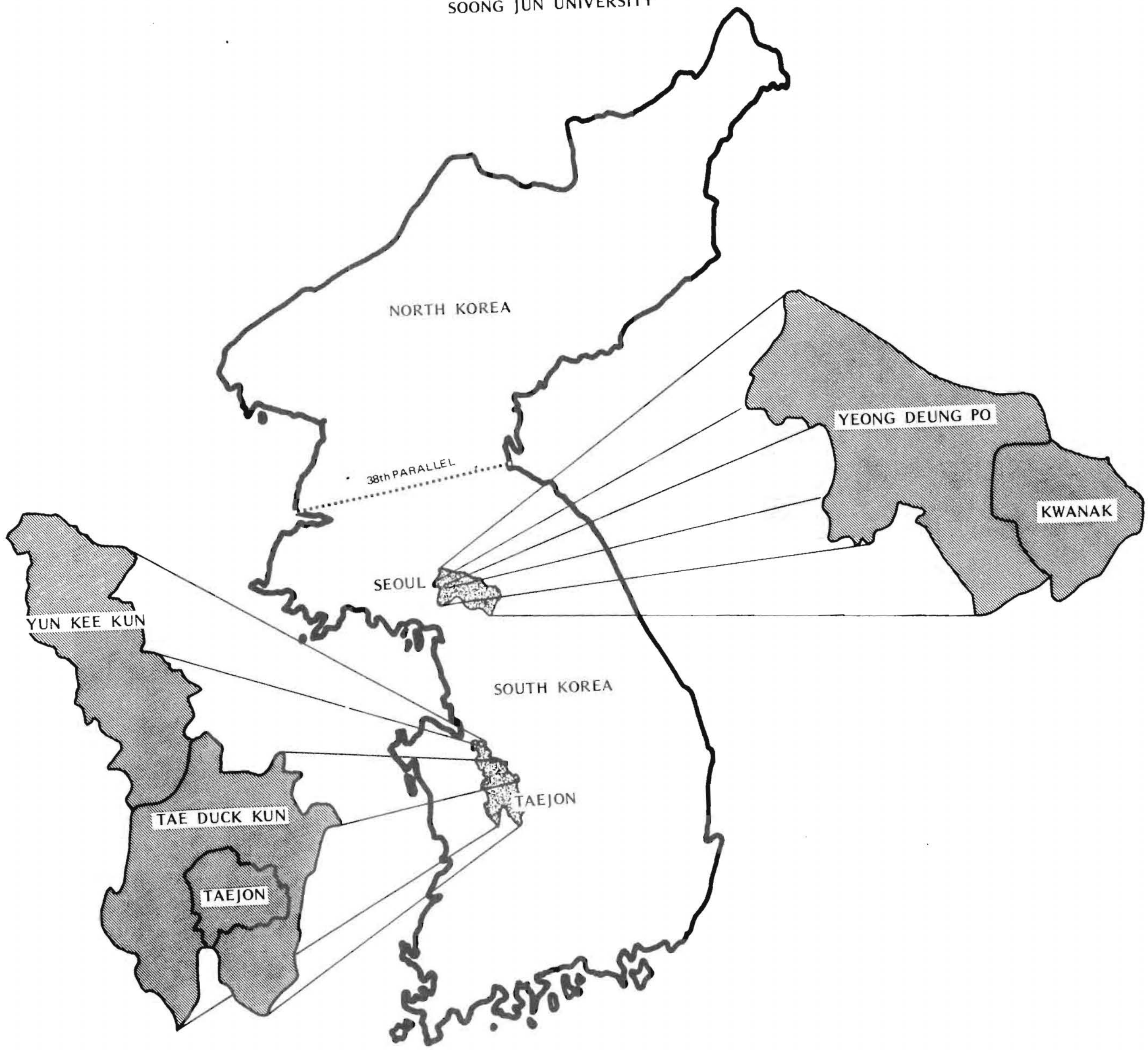
Introduction to Base Line Data

The three sections that follow consist basically of the compilation of selected base line data on a national and regional basis. Section A covers data for the Republic of Korea, Section B covers the Yeong Deung Po area near the Seoul campus, and Section C covers the area near the Taejon campus.

Perhaps the most significant data are those relating to the various types of manufacturing operations found in the republic and particularly in the specific areas to be served by Soong Jun University. To the extent available, these data include by employment size the number of establishments, number of workers, monthly average income, gross output, and value added for each subgroup of manufacturing activity. Additional data are given on population, employment, and land area for certain of the geographic units involved.

The primary sources of the information in the following sections are the annual publications of the national government, such as 1972 Statistical Year Books for the Republic of Korea, Seoul, and the Province of Chung Nam (Taejon). Similar data will be compiled at the end of the project for comparison and evaluation. In addition, comparable data will be gathered on each industry or group of industries which Soong Jun University assists.

MAP 1
SMALL INDUSTRY STUDY AREAS
SOONG JUN UNIVERSITY



Section A

BASE LINE DATA: REPUBLIC OF KOREA

Table A-1

POPULATION AND EMPLOYMENT, REPUBLIC OF KOREA, 1972

Category	Number (000)
Total estimated population	32,360
Male	15,985
Female	16,260
Population 14 years and over	18,764
Economically active	10,500
Employed	10,026
Agriculture, forestry, fishing	5,078
Mining and quarrying	51
Manufacturing	1,372
Construction	371
Transportation, storage, communication	344
Social overhead, capital, and other services	2,810
Unemployed	474
Economically not active	8,264

Table A-2

BASIC MANUFACTURING DATA, REPUBLIC OF KOREA, 1971

ISIC*	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
3	MANUFACTURING	23,412	848,194	1,672,740,326	690,534,615
	5 - 9 workers	12,977	80,729	54,521,105	25,705,363
	10 - 19	5,155	68,410	58,243,638	24,697,819
	20 - 49	2,913	87,229	94,321,347	38,196,063
	50 - 99	988	68,054	114,401,186	47,473,968
	100 - 199	617	87,396	141,365,389	57,152,227
	200 - 499	506	154,301	345,668,897	127,380,752
	500 workers or more	256	302,075	864,218,764	369,928,423
31	MANUFACTURE OF FOOD, BEVERAGES, AND TOBACCO	5,011	114,806	365,147,588	170,213,217
	5 - 9	3,266	19,945	14,070,555	6,925,080
	10 - 19	1,037	13,345	13,555,672	6,154,946
	20 - 49	432	12,599	23,232,500	9,905,199
	50 - 99	125	8,677	30,327,073	9,052,881
	100 - 199	71	9,835	43,331,258	15,407,429
	200 - 499	52	15,789	62,051,080	17,593,106
	500 workers or more	28	34,656	178,579,450	105,114,576
311	Food manufacturing	3,348	72,578	193,339,854	60,638,319
	5 - 9	2,127	12,688	6,360,942	3,052,064
	10 - 19	696	9,035	6,901,992	2,814,252
	20 - 49	334	9,725	13,890,231	4,500,003
	50 - 99	95	6,527	24,123,384	6,309,106
	100 - 199	50	6,917	34,680,480	11,679,540
	200 - 499	32	9,806	50,778,474	13,053,786
	500 workers or more	14	17,880	46,604,351	19,229,568
313	Beverage industries	1,640	27,889	93,740,281	54,560,988
	5 - 9	1,139	7,257	7,709,613	3,873,016
	10 - 19	341	4,310	6,653,680	3,340,694
	20 - 49	98	2,834	9,342,269	5,405,196
	50 - 99	27	1,920	6,203,689	2,743,775
	100 - 199	17	2,245	8,650,778	3,787,889
	200 - 499	12	3,446	11,272,606	4,539,320
	500 workers or more	6	5,877	43,907,646	30,871,098

* International Standard Industrial Classification

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
314	Tobacco manufactures	23	14,339	78,067,453	55,013,910
	5 - 9 workers				
	10 - 19				
	20 - 49				
	50 - 99	3	230	-	-
	100 - 199	4	673	-	-
	200 - 499	8	2,537	-	-
	500 workers or more	8	10,899	78,067,453	55,013,910
32	TEXTILE, WEARING APPAREL, AND LEATHER INDUSTRIES	6,287	274,734	333,830,930	120,803,827
	5 - 9	3,325	20,203	12,680,057	6,201,083
	10 - 19	1,310	17,756	13,871,052	5,335,154
	20 - 49	866	25,578	20,884,069	7,538,994
	50 - 99	285	20,207	17,824,734	7,686,403
	100 - 199	236	34,314	27,782,132	11,848,815
	200 - 499	193	57,845	67,909,843	24,287,809
	500 workers or more	72	98,831	172,879,043	57,905,569
321	Manufacture of textiles	2,696	202,660	261,801,752	94,466,805
	5 - 9	614	4,084	2,304,964	958,170
	10 - 19	753	10,508	8,776,673	2,891,275
	20 - 49	703	21,252	17,603,670	6,302,052
	50 - 99	243	17,290	14,996,098	6,492,562
	100 - 199	190	27,401	23,499,312	9,959,618
	200 - 499	143	42,298	53,197,843	18,472,784
	500 workers or more	51	79,827	141,424,192	49,390,344
322	Manufacture of wearing apparel, except footwear	3,169	63,135	62,427,606	22,864,552
	5 - 9	2,389	14,335	9,276,074	4,707,037
	10 - 19	514	6,660	4,633,025	2,271,609
	20 - 49	132	3,385	2,323,637	990,353
	50 - 99	32	2,212	1,986,051	869,018
	100 - 199	37	5,647	2,938,094	1,293,184
	200 - 499	47	14,627	13,164,203	5,302,158
	500 workers or more	18	16,269	28,106,522	7,431,193

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
323	Manufacture of leather and products of leather, leather sub-stitutes, and fur, except footwear and wearing apparel	88	2,996	4,020,477	1,393,296
	5 - 9 workers	32	205	183,328	65,278
	10 - 19	20	286	248,729	83,488
	20 - 49	23	717	779,957	166,702
	50 - 99	6	411	568,575	215,327
	100 - 199	5	773	943,106	425,027
	200 - 499	2	604	1,296,782	437,475
	500 workers or more	-	-	-	-
324	Manufacture of foot-wear, except vulcanized or moulded rubber or plastic footwear	334	5,943	5,581,095	2,079,174
	5 - 9	290	1,579	915,691	470,598
	10 - 19	23	302	212,625	88,782
	20 - 49	9	224	177,805	79,887
	50 - 99	4	294	274,010	109,496
	100 - 199	4	493	401,620	170,987
	200 - 499	1	316	251,015	75,392
	500 workers or more	3	2,735	3,348,329	1,084,032
33	MANUFACTURE OF WOOD AND WOOD PRODUCTS, INCLUDING FURNITURE	2,023	41,660	96,926,059	31,697,471
	5 - 9	1,459	9,185	8,196,696	3,440,204
	10 - 19	417	5,281	5,421,597	2,164,718
	20 - 49	95	2,744	3,237,108	1,220,391
	50 - 99	23	1,387	3,013,398	728,457
	100 - 199	9	1,207	2,278,621	1,181,950
	200 - 499	8	2,510	7,027,142	1,950,760
	500 workers or more	12	19,346	67,751,497	21,010,991
331	Manufacture of wood and cork products, except furniture	1,107	32,931	92,240,153	29,348,216
	5-9	736	4,779	6,057,453	2,318,135
	10 - 19	264	3,289	4,266,423	1,585,442
	20 - 49	65	1,907	2,882,991	1,052,096
	50 - 99	18	1,100	2,773,076	607,707
	100 - 199	8	1,070	2,178,959	1,112,104

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
331	Manufacture of wood and cork products, except furniture (continued)				
	200 - 499 workers	4	1,440	6,329,754	1,659,741
	500 workers or more	12	19,346	67,751,497	21,010,991
332	Manufacture of furniture and fixtures, except primarily of metal	916	8,729	4,685,906	2,349,255
	5 - 9	723	4,406	2,139,243	1,122,069
	10 - 19	154	1,992	1,155,174	579,276
	20 - 49	30	837	354,117	168,295
	50 - 99	5	287	240,322	118,750
	100 - 199	1	137	99,662	69,846
	200 - 499	4	1,070	697,388	291,019
	500 workers or more	-	-	-	-
34	MANUFACTURE OF PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING	1,732	51,461	88,058,248	38,900,201
	5 - 9	956	6,008	3,393,548	1,791,563
	10 - 19	391	5,119	4,298,075	1,965,017
	20 - 49	202	6,202	6,170,904	2,925,567
	50 - 99	81	5,511	5,620,799	2,093,297
	100 - 199	47	6,543	13,003,288	4,980,940
	200 - 499	43	13,219	32,827,235	12,935,972
	500 workers or more	12	8,859	22,744,399	12,207,845
341	Manufacture of paper and paper products	557	20,403	50,666,021	16,612,109
	5 - 9	224	1,473	505,052	224,965
	10 - 19	138	1,809	1,225,584	483,062
	20 - 49	98	3,103	2,895,094	988,385
	50 - 99	50	3,311	3,984,463	1,198,186
	100 - 199	23	3,247	8,919,451	2,637,977
	200 - 499	22	6,284	25,369,339	8,666,664
	500 workers or more	2	1,176	7,767,038	2,412,870
342	Printing, publishing, and allied industries	1,175	31,058	37,392,227	22,288,092
	5 - 9	732	4,535	2,888,496	1,566,598
	10 - 19	253	3,310	3,072,491	1,481,955
	20 - 49	104	3,099	3,275,810	1,937,182

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
342	Printing, publishing, and allied industries (continued)				
	50 - 99 workers	31	2,200	1,636,336	895,111
	100 - 199	24	3,296	4,083,837	2,342,963
	200 - 499	21	6,935	7,457,896	4,269,308
	500 workers or more	10	7,683	14,977,361	9,794,975
35	MANUFACTURE OF CHEMICALS AND CHEMICAL, PETROLEUM, COAL, RUBBER, AND PLASTIC PRODUCTS	1,542	104,298	380,952,041	162,305,242
	5 - 9	625	4,181	5,047,814	1,709,412
	10 - 19	398	5,259	7,424,172	2,582,695
	20 - 49	264	8,046	14,672,650	4,753,086
	50 - 99	92	6,123	17,430,451	6,360,018
	100 - 199	63	9,096	23,880,481	10,534,295
	200 - 499	53	16,349	103,114,551	40,888,812
	500 workers or more	47	55,244	209,381,922	95,476,924
351	Manufacture of industrial chemicals	229	25,721	89,252,165	40,570,566
	5 - 9	50	331	337,811	133,259
	10 - 19	67	969	1,045,612	452,983
	20 - 49	46	1,452	2,390,726	830,265
	50 - 99	23	1,629	2,620,102	941,538
	100 - 199	12	1,697	4,431,825	1,555,436
	200 - 499	15	4,661	14,424,000	5,733,942
	500 workers or more	16	15,032	64,002,089	30,923,143
352	Manufacture of other chemical products	394	23,502	62,831,349	32,244,230
	5 - 9	129	863	881,794	328,906
	10 - 19	103	1,367	1,629,889	613,207
	20 - 49	78	2,334	2,549,567	1,034,441
	50 - 99	32	2,158	3,873,628	1,762,989
	100 - 199	22	3,200	5,258,553	2,895,382
	200 - 499	22	7,010	23,194,129	11,295,981
	500 workers or more	8	6,570	25,443,789	14,313,324
353	Petroleum refineries	25	3,372	129,636,873	56,381,938
	5 - 9	6	40	73,829	28,925
	10 - 19	3	40	32,813	18,651
	20 - 49	4	138	278,926	63,699

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish- ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
353	Petroleum refineries (continued)				
	50 - 99 workers	6	352	2,079,650	799,974
	100 - 199	-	-	-	-
	200 - 499	4	1,427	55,040,659	21,499,093
	500 workers or more	2	1,375	72,130,996	33,971,596
354	Manufacture of miscel- laneous products of petroleum and coal	603	10,979	40,172,186	12,323,039
	5 - 9	348			
	10 - 19	155	1,932	3,990,861	1,194,124
	20 - 49	65	2,001	6,650,283	1,786,773
	50 - 99	15	974	4,800,291	1,303,763
	100 - 199	15	2,259	12,592,979	5,365,682
	200 - 499	5	1,503	8,809,473	1,630,971
	500 workers or more	-	-	-	-
355	Manufacture of rubber products	146	31,757	43,555,966	14,810,231
	5 - 9	38	258	226,824	82,570
	10 - 19	34	456	435,432	178,484
	20 - 49	37	1,070	1,249,242	485,300
	50 - 99	10	653	3,833,328	1,409,694
	100 - 199	7	1,114	728,085	262,143
	200 - 499	6	1,558	1,646,290	728,825
	500 workers or more	14	26,648	35,436,765	11,663,215
356	Manufacture of plas- tic products not elsewhere classified	146	8,967	15,503,502	5,975,238
	5 - 9	55	377	199,257	94,026
	10 - 19	36	495	288,565	125,246
	20 - 49	34	1,051	1,553,906	552,608
	50 - 99	6	357	223,452	142,060
	100 - 199	7	828	869,039	455,652
	200 - 499	1	240	-	-
	500 workers or more	7	5,619	12,368,283	4,605,646

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish- ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
36	MANUFACTURE OF NON-METALLIC MINERAL PROD-UCTS, EXCEPT PRODUCTS OF PETROLEUM AND COAL	2,221	48,406	79,133,918	41,403,358
	5 - 9 workers	1,565	9,616	3,865,114	2,074,315
	10 - 19	346	4,435	2,185,377	1,138,475
	20 - 49	164	5,016	3,062,911	1,575,019
	50 - 99	72	5,029	15,088,429	10,998,414
	100 - 199	31	4,260	6,385,507	2,768,141
	200 - 499	31	10,288	17,580,156	7,085,070
	500 workers or more	12	9,782	30,966,426	15,763,924
361	Manufacture of pottery, china, and earthenware	332	5,892	2,240,936	1,289,880
	5 - 9	202	1,321	418,123	253,188
	10 - 19	79	1,026	383,622	215,922
	20 - 49	36	1,032	399,503	234,396
	50 - 99	7	554	261,060	143,262
	100 - 199	4	520	228,642	149,396
	200 - 499	3	388	377,383	207,553
	500 workers or more	1	551	172,603	86,063
362	Manufacture of glass and glass products	85	8,441	10,882,845	5,985,733
	5 - 9	7	47	23,727	13,284
	10 - 19	16	238	175,245	69,818
	20 - 49	31	1,030	462,385	235,535
	50 - 99	12	839	505,690	317,162
	100 - 199	8	969	414,084	216,291
	200 - 499	8	2,491	2,424,534	1,321,585
	500 workers or more	3	2,827	6,877,180	3,812,058
369	Manufacture of other nonmetallic mineral products	1,804	34,073	66,010,137	34,127,745
	5 - 9	1,356	8,248	3,423,264	1,807,843
	10 - 19	251	3,171	1,626,510	852,735
	20 - 49	97	2,954	2,201,023	1,105,088
	50 - 99	53	3,636	14,321,679	10,537,990
	100 - 199	19	2,751	5,742,781	2,402,454
	200 - 499	20	6,909	14,778,239	5,555,832
	500 workers or more	8	6,404	23,916,641	11,865,803

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
37	BASIC METAL INDUSTRIES	321	25,872	97,890,770	25,037,832
	5 - 9 workers	57	399	459,472	163,884
	10 - 19	100	1,434	1,217,077	494,753
	20 - 49	82	2,464	3,216,937	965,938
	50 - 99	36	2,525	5,470,172	2,234,161
	100 - 199	13	1,673	3,193,514	850,843
	200 - 499	22	6,995	21,267,472	7,406,277
	500 workers or more	11	10,382	63,066,126	12,921,976
371	Iron and steel basic industries	233	20,404	81,407,542	20,202,169
	5 - 9	39	260	286,356	113,726
	10 - 19	68	990	790,454	330,339
	20 - 49	64	1,902	2,258,003	753,705
	50 - 99	26	1,766	4,523,761	1,954,902
	100 - 199	11	1,465	3,125,256	797,479
	200 - 499	16	5,087	14,886,188	4,817,550
	500 workers or more	9	8,934	55,537,524	11,434,460
372	Nonferrous metal basic industries	88	5,468	16,483,228	4,835,663
	5 - 9	18	139	173,116	50,158
	10 - 19	32	444	426,623	164,414
	20 - 49	18	562	958,934	212,233
	50 - 99	10	759	946,411	272,259
	100 - 199	2	208	68,258	53,364
	200 - 499	6	1,908	6,381,284	2,588,727
	500 workers or more	2	1,448	7,528,602	1,487,508
38	MANUFACTURE OF FABRICATED METAL PRODUCTS, MACHINERY, AND EQUIPMENT	3,719	144,362	199,469,136	83,996,369
	5 - 9	1,527	9,891	5,808,677	2,929,356
	10 - 19	1,017	13,897	9,314,495	4,417,814
	20 - 49	718	21,784	17,700,929	8,407,261
	50 - 99	239	16,177	17,908,807	7,644,007
	100 - 199	104	14,415	17,579,957	7,658,808
	200 - 499	70	21,970	27,389,439	11,443,318
	500 workers or more	44	46,228	103,766,832	41,495,805

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish- ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
381	Manufacture of fabricated metal products, except machinery and equipment	1,332	38,164	34,210,199	14,957,510
	5 - 9 workers	659	4,206	2,205,647	1,090,665
	10 - 19	349	4,681	2,869,082	1,260,028
	20 - 49	210	6,376	5,044,232	2,131,493
	50 - 99	59	4,090	4,202,489	1,721,842
	100 - 199	28	3,780	6,780,275	2,832,415
	200 - 499	18	5,247	6,367,050	2,298,155
	500 workers or more	9	9,787	6,741,424	3,622,912
382	Manufacture of machinery, except electrical	941	21,004	22,932,975	9,588,201
	5 - 9	420	2,780	1,595,802	825,265
	10 - 19	293	3,923	2,770,971	1,194,983
	20 - 49	151	4,372	3,949,059	1,696,146
	50 - 99	48	3,351	5,011,456	1,896,600
	100 - 199	18	2,383	3,020,547	1,077,836
	200 - 499	9	2,465	3,511,562	1,735,793
	500 workers or more	2	1,730	3,073,578	1,161,578
383	Manufacture of electrical machinery apparatus, appliances, and supplies	451	42,172	61,897,715	27,608,604
	5 - 9	117	794	581,282	232,420
	10 - 19	101	1,462	1,155,240	571,731
	20 - 49	110	3,492	3,412,517	1,670,035
	50 - 99	49	3,240	3,534,409	1,515,060
	100 - 199	32	4,553	5,050,929	2,402,082
	200 - 499	23	7,780	10,924,972	4,241,936
	500 workers or more	19	20,851	37,512,356	16,975,340
384	Manufacture of transport equipment	890	37,769	75,306,227	29,810,365
	5 - 9	306	1,945	1,055,104	582,521
	10 - 19	240	3,351	2,265,955	1,253,756
	20 - 49	224	6,830	4,809,271	2,686,010
	50 - 99	71	4,646	3,720,149	2,048,215
	100 - 199	20	2,869	2,255,260	1,119,767
	200 - 499	16	5,133	5,252,665	2,619,229
	500 workers or more	13	12,995	55,947,823	19,500,867

(continued)

Table A-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Gross Output (000 Won)	Value Added (000 Won)
385	Manufacture of professional and scientific and measuring and controlling equipment, not elsewhere classified, and of photographic and optical goods	105	5,250	5,122,020	2,031,689
	5 - 9 workers	25	166	450,832	198,485
	10 - 19	34	480	253,247	137,316
	20 - 49	23	714	485,850	223,577
	50 - 99	12	850	1,440,304	462,290
	100 - 199	6	830	466,946	226,708
	200 - 499	4	1,345	1,533,190	548,205
	500 workers or more	1	865	491,651	235,108
39	OTHER MANUFACTURING INDUSTRIES	556	42,595	31,331,636	16,177,098
	5 - 9	197	1,301	999,172	470,466
	10 - 19	139	1,884	956,121	444,247
	20 - 49	90	2,836	2,143,339	940,608
	50 - 99	35	2,418	1,717,323	676,330
	100 - 199	43	6,073	9,930,631	1,861,006
	200 - 499	34	9,336	6,501,979	3,789,628
	500 workers or more	18	18,747	23,083,071	8,030,813

Source: Republic of Korea Year Book - 1972.

Section B

BASE LINE DATA: SEOUL AREA

Table B-1

LAND AREA AND POPULATION BY DONG, YEONG DEUNG PO-GU

Dong	Area (in sq. km.)	Population
Yeong Deung Po-Gu	208.00	1,314,318
Noryangiin 1 Dong	0.541	20,872
Noryangiin 2 Dong	0.541	21,815
Sangdo 1 Dong	2.203	33,820
Sangdo 2 Dong	1.827	30,053
Sangdo 3 Dong	2.136	24,032
Bongcheon 1 Dong	1.580	33,001
Bongcheon 2 Dong	1.880	38,863
Bongcheon 3 Dong	1.540	34,468
Bongcheon 4 Dong	2.570	20,774
Bon Dong	0.752	26,375
Heugseog 1 Dong	0.795	21,968
Heugseog 2 Dong	2.772	23,348
Heugseog 3 Dong	0.361	17,673
Sadang 1 Dong	10.700	18,980
Sadang 2 Dong	1.960	45,545
Jamweon Dong	6.820	5,935
Seochon Dong	6.020	5,242
Ryangiae Dong	15.760	5,547
Singil 1 Dong	1.527	26,140
Singil 2 Dong	0.370	16,732
Singil 3 Dong	1.134	29,495
Singil 4 Dong	0.387	21,735
Daebang 1 Dong	1.500	26,416
Daebang 2 Dong	1.047	24,393
Sindaebang Dong	0.890	23,035
Guro 1 Dong	5.020	41,543
Guro 2 Dong	0.981	40,044
Guro 3 Dong	0.260	30,223
Sindorim Dong	3.689	24,915
Garibong Dong	8.990	30,592
Siheung 1 Dong	3.251	16,251
Siheung 2 Dong	3.539	34,652
Sinrim 1 Dong	4.500	25,433
Sinrim 2 Dong	7.500	33,889
Sinrim 3 Dong	6.250	24,018
Gocheog Dong	3.770	21,530

(continued)

Table B-1 (continued)

Dong	Area (in sq. km.)	Population
Gaebong Dong	4.330	9,850
Oryu Dong	9.280	30,413
Yeong Deung Po 1 Dong	0.728	41,199
Yeong Deung Po 2 Dong	0.770	17,155
Yeong Deung Po 3 Dong	8.681	16,989
Dangsan 1 Dong	1.156	24,763
Dangsan 2 Dong	1.360	18,442
Dorim 1 Dong	0.191	14,315
Dorim 2 Dong	0.441	15,632
Munlae 1 Dong	0.973	16,274
Munlae 2 Dong	0.718	15,458
Yangpyeong 1 Dong	0.982	19,246
Yangpyeong 2 Dong	2.790	27,182
Yeomchang Dong	9.610	40,658
Sinieong Dong	5.080	31,217
Hwagog 1 Dong	5.280	15,575
Hwagog 2 Dong	2.840	12,703
Gayang Dong	5.080	4,589
Balsan Dong	6.500	5,641
Gonghang Dong	5.790	15,874
Banghwa Dong	11.810	24,457
Gwahae Dong	8.250	4,239

Source: Statistical Year Book, City of Seoul, 1972.

Table B-2

BASIC MANUFACTURING DATA, YEONG DEUNG PO, 1971

ISIC*	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
3	MANUFACTURING	846	41,156			
	5 - 9 workers	131	977			
	10 - 19	191	2,779			
	20 - 49	239	7,727			
	50 - 99	168	12,276			
	100 - 199	117	17,397			
	200 and up	-	-			
31	MANUFACTURE OF FOOD, BEVERAGES, AND TOBACCO	34	1,384	20,000		
	5 -9	8	60			
	10 - 19	10	141			
	20 - 49	7	238			
	50 - 99	5	327			
	100 - 199	4	618			
	200 and up	-	-			
311	Food manufacturing	24	988	20,000		
	5 - 9	6	48			
	10 - 19	9	131			
	20 - 49	4	119			
	50 - 99	1	72			
	100 - 199	4	618			
	200 and up	-	-			

* International Standard Industrial Classification

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
313	Beverage industries	11	396	20,000		
	5 - 9 workers	2	12			
	10 - 19	1	10			
	20 - 49	3	119			
	50 - 99	5	255			
	100 and up	-	-			
32	TEXTILE, WEARING APPAREL, AND LEATHER INDUSTRIES	123	8,634	20,340		3,625.2
	5 - 9	18	134			
	10 - 19	15	206			
	20 - 49	27	929			
	50 - 99	26	1,961			
	100 - 199	37	5,404			
	200 and up	-	-			
321	Manufacture of textiles	102	6,876	35,000		1,500.0
	5 - 9	13	99			
	10 - 19	14	191			
	20 - 49	27	929			
	50 - 99	20	1,517			
	100 - 199	28	4,140			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establishments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
323	Manufacture of leather and products of leather, leather substitutes, and fur, except footwear and wearing apparel	5	378	11,500		5,750.0
	5 - 9 workers	2	14			
	10 - 19	-	-			
	20 - 49	-	-			
	50 - 99	-	-			
	100 - 199	3	364			
	200 and up	-	-			
33	MANUFACTURE OF WOOD AND WOOD PRODUCTS, INCLUDING FURNITURE	21	724	16,500		
	5 - 9	3	21			
	10 - 19	3	39			
	20 - 49	10	295			
	50 - 99	5	369			
	100 and up	-	-			
331	Manufacture of wood and cork products, except furniture	13	403	16,000		
	5 - 9	2	14			
	10 - 19	2	25			
	20 - 49	7	229			
	50 - 99	2	135			
	100 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
332	Manufacture of furniture and fixtures, except primarily of metal	10	321	16,000		
	5 - 9 workers	1	7			
	10 - 19	1	14			
	20 - 49	3	66			
	50 - 99	5	234			
	100 and up	-	-			
34	MANUFACTURE OF PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING	47	2,310	20,760	1,600.0	
	5 - 9	7	54			
	10 - 19	7	104			
	20 - 49	17	550			
	50 - 99	12	901			
	100 - 199	4	701			
	200 and up	-	-			
341	Manufacture of paper and paper products	32	1,354	18,000	1,600.0	
	5 - 9	4	34			
	10 - 19	6	88			
	20 - 49	14	469			
	50 - 99	6	434			
	100 - 199	2	329			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish- ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
342	Printing, publishing, and allied industries	15	956	23,500		
	5 - 9 workers	3	20			
	10 - 19	1	16			
	20 - 49	3	81			
	50 - 99	6	467			
	100 - 199	2	372			
	200 and up	-	-			
35	MANUFACTURE OF CHEMICALS AND CHEMICAL, PETROLEUM, COAL, RUBBER, AND PLASTIC PRODUCTS	144	5,435	21,760	1,417.6	
	5 - 9	34	235			
	10 - 19	38	543			
	20 - 49	39	1,225			
	50 - 99	20	1,556			
	100 - 199	13	1,876			
	200 and up	-	-			
351	Manufacture of industrial chemicals	44	1,477	22,020		2,250.0
	5 - 9	7	51			
	10 - 19	12	179			
	20 - 49	15	459			
	50 - 99	9	684			
	100 - 199	1	104			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
352	Manufacture of other chemical products	66	2,717	21,020		1,000.0
	5 - 9 workers	18	119			
	10 - 19	14	195			
	20 - 49	20	640			
	50 - 99	5	392			
	100 - 199	9	1,371			
	200 and up	-	-			
353	Petroleum refineries	3	24			
	5 - 9	2	10			
	10 - 19	1	14			
	20 and up	-	-			
354	Manufacture of miscel-laneous products of petroleum and coal	4	216			
	5 - 9	-	-			
	10 - 19	1	15			
	20 - 49	1	25			
	50 - 99	2	176			
	100 and up	-	-			
355	Manufacture of rubber products	12	264	20,000		1,500.0
	5 - 9	5	39			
	10 - 19	4	55			
	20 - 49	2	57			
	50 - 99	-	-			
	100 - 199	1	113			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
356	Manufacture of plastic products not elsewhere classified	15	737	24,000		1,000.0
	5 - 9 workers	2	16			
	10 - 19	6	85			
	20 - 49	1	44			
	50 - 99	4	304			
	100 - 199	2	288			
	200 and up	-	-			
36	MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS, EXCEPT PRODUCTS OF PETROLEUM AND COAL	39	2,144	16,000		
	5 - 9 workers	1	7			
	10 - 19	10	145			
	20 - 49	13	437			
	50 - 99	8	577			
	100 - 199	7	978			
	200 and up	-	-			
361	Manufacture of pottery, china, and earthenware	2	164	16,000		
	5 - 9	-	-			
	10 - 19	-	-			
	20 - 49	-	-			
	50 - 99	1	54			
	100 - 199	1	110			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
362	Manufacture of glass and glass products	13	1,169			
	5 - 9 workers	-	-			
	10 - 19	-	-			
	20 - 49	5	159			
	50 - 99	2	142			
	100 - 199	6	868			
	200 and up	-	-			
369	Manufacture of other nonmetallic metal products	24	811			
	5 - 9	1	7			
	10 - 19	10	145			
	20 - 49	8	278			
	50 - 99	5	381			
	100 and up	-	-			
37	BASIC METAL INDUSTRIES	55	2,376	25,020		
	5 - 9 workers	9	69			
	10 - 19	15	205			
	20 - 49	14	423			
	50 - 99	13	1,008			
	100 - 199	4	671			
	200 and up	-	-			
371	Iron and steel basic industries	30	1,379	50,000		
	5 - 9	6	48			
	10 - 19	9	118			
	20 - 49	6	194			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
371	Iron and steel basic industries (continued)					
	50 - 99 workers	5	348			
	100 - 199	4	671			
	200 and up	-	-			
372	Nonferrous metal basic industries	25	997	17,760		
	5 - 9	3	21			
	10 - 19	6	87			
	20 - 49	8	229			
	50 - 99	8	660			
	100 and up	-	-			
38	MANUFACTURE OF FABRICATED METAL PRODUCTS, MACHINERY, AND EQUIPMENT	317	13,874	24,480		8,006.8
	5 - 9	44	340			
	10 - 19	86	1,295			
	20 - 49	94	3,305			
	50 - 99	62	4,460			
	100 - 199	31	4,474			
	200 and up	-	-			
381	Manufacture of fabricated metal products, except machinery and equipment	28	1,084	23,560		12,540.2
	5 - 9	2	18			
	10 - 19	11	142			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
381	Manufacture of fabricated metal products, except machinery and equipment (continued)					
	20 - 49 workers	7	210			
	50 - 99	6	425			
	100 - 199	2	289			
	200 and up	-	-			
382	Manufacture of machinery, except electrical	172	6,019	29,160		
	5 - 9	37	286			
	10 - 19	43	638			
	20 - 49	55	1,712			
	50 - 99	26	1,802			
	100 - 199	11	1,581			
	200 and up	-	-			
383	Manufacture of electrical machinery apparatus, appliances, and supplies	63	3,344	20,160		3,473.2
	5 - 9	4	27			
	10 - 19	15	274			
	20 - 49	21	763			
	50 - 99	15	1,113			
	100 - 199	8	1,167			
	200 and up	-	-			

(continued)

Table B-2 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income	Gross Output (000 Won)	Value Added (000 Won)
384	Manufacture of transport equipment	38	2,013	17,500		
	5 - 9 workers	1	9			
	10 - 19	13	177			
	20 - 49	8	258			
	50 - 99	12	917			
	100 - 199	4	652			
	200 and up	-	-			
385	Manufacture of professional and scientific and measuring and controlling equipment, not elsewhere classified, and of photographic and optical goods	16	1,144	32,000		
	5 - 9 workers	-	-			
	10 - 19	4	64			
	20 - 49	3	92			
	50 - 99	3	203			
	100 - 199	6	785			
	200 and up	-	-			
39	OTHER MANUFACTURING INDUSTRIES	66	4,545	17,500		
	5 - 9	7	57			
	10 - 19	7	101			
	20 - 49	18	595			
	50 - 99	17	1,117			
	100 - 199	17	2,675			
	200 and up	-	-			

Source: Chung Nam Statistical Year Book, 1972.

Section C

BASE LINE DATA: TAEJON AREA

Table C-1

LAND AREA AND POPULATION BY DISTRICT
(OFFICES OF TAEJON CITY)

District-Office	Area (in sq. km.)	Population
Eastern District	15.71	106,691
Northern District	13.58	91,028
Central District	12.81	141,166
Western District	46.28	113,017
Total	88.38	451,902

Source: Chung Nam Statistical Year Book, 1972.

Table C-2

LAND AREA AND POPULATION OF DAEDUCK COUNTY

Town	Area (in sq. km.)	Population
Yu Seong Eup	41.13	21,727
San Nae Myon	82.52	11,602
Dong Myon	62.65	10,922
Hoe Deog Myon	18.29	8,850
Book Myon	43.47	23,213
Ku Chug Myon	44.34	10,736
Tan Dong Myon	42.98	10,401
Chin Kap Myon	52.45	12,366
Ki Seong Myon	67.81	15,060
Total	455.64	124,877

Source: Chung Nam Statistical Year Book, 1972.

Table C-3

LAND AREA AND POPULATION OF YONGI COUNTY

Town	Area (in sq. km.)	Population
Jochiweon Eup	13.4	27,894
Dong Myon	30.5	10,326
Seo Myon	52.4	12,910
Nam Myon	52.0	13,404
Geumnan Myon	79.6	18,126
Jeoneui Myon	49.1	12,544
Jeondong Myon	79.8	19,377
Total	356.9	114,581

Source: Yongi County Statistical Year Book.

Table C-4

BASIC MANUFACTURING DATA, TAEJON AREA, 1971

ISIC*	Subgroup and Size	No. of Establish- ments	No. of Workers	Monthly Average Income
3	MANUFACTURING	381	9,193	
	5 - 9 workers	55	398	
	10 - 19	201	2,649	
	20 - 49	77	2,543	
	50 - 99	33	1,705	
	100 - 199	15	1,898	
	200 and up	-	-	
31	MANUFACTURE OF FOOD, BEVERAGES, AND TOBACCO	32	544	15,000
	5 - 9	-	-	
	10 - 19	30	344	
	20 - 49	1	81	
	50 - 99	1	119	
	100 and up	-	-	
32	TEXTILE, WEARING AP- PAREL, AND LEATHER INDUSTRIES	93	2,271	12,500
	5 - 9	5	40	
	10 - 19	60	765	
	20 - 49	15	455	
	50 - 99	10	641	
	100 - 199	3	370	
	200 and up	-	-	
321	Manufacture of textiles	76	1,888	12,500
	5 - 9	5	40	
	10 - 19	48	610	
	20 - 49	11	347	
	50 - 99	10	641	
	100 - 199	2	250	
	200 and up	-	-	

* International Standard Industrial Classification

(continued)

Table C-4 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income
3213	Knitting mills	12	196	12,500
	5 - 9 workers	-	-	
	10 - 19	9	108	
	20 - 49	3	88	
	50 and up	-	-	
3219	Manufacture of Silk	3	153	12,500
	5 - 9	-	-	
	10 - 19	2	33	
	20 - 49	-	-	
	50 - 99	-	-	
	100 - 199	1	120	
	200 and up	-	-	
323	Manufacture of leather and leather products, leather substitutes, and fur, except foot-wear and wearing apparel	2	34	15,000
	5 - 9	-	-	
	10 - 19	1	14	
	20 - 49	1	20	
	50 and up	-	-	
341	Manufacture of paper and paper products	16	617	16,000
	5 - 9	5	48	
	10 - 19	3	82	
	20 - 49	6	262	
	50 - 99	1	70	
	100 - 199	1	155	
	200 and up	-	-	
351	Manufacture of indus-trial chemicals	28	467	15,000
	5 - 9	11	100	
	10 - 19	13	256	
	20 - 49	4	111	
	50 and up	-	-	

(continued)

Table C-4 (continued)

ISIC	Subgroup and Size	No. of Establish- ments	No. of Workers	Monthly Average Income
352	Manufacture of other chemical products	12	270	15,000
	5 - 9 workers	2	10	
	10 - 19	5	63	
	20 - 49	4	127	
	50 - 99	1	70	
	100 and up	-	-	
355	Manufacture of rubber products	6	185	12,000
	5 - 9	1	6	
	10 - 19	2	22	
	20 - 49	2	57	
	50 - 99	-	-	
	100 - 199	1	100	
	200 and up	-	-	
361	Manufacture of pottery, china, and earthenware	11	216	17,000
	5 - 9	1	5	
	10 - 19	6	75	
	20 - 49	3	76	
	50 - 99	1	60	
	100 and up	-	-	
37	BASIC METAL INDUSTRIES	1	32	15,000
	5 - 9	-	-	
	10 - 19	-	-	
	20 - 49	1	32	
	50 and up	-	-	
38	MANUFACTURE OF FABRICATED METAL PRODUCTS, MACHINERY, AND EQUIPMENT	140	2,895	12,500
	5 - 9	29	184	
	10 - 19	65	804	
	20 - 49	29	947	
	50 - 99	11	194	
	100 - 199	6	766	
	200 and up	-	-	

(continued)

Table C-4 (continued)

ISIC	Subgroup and Size	No. of Establish-ments	No. of Workers	Monthly Average Income
39	OTHER MANUFACTURING INDUSTRIES	42	1,696	15,000
	5 - 9 workers	1	5	
	10 - 19	17	238	
	20 - 49	12	395	
	50 - 99	8	551	
	100 - 199	4	507	
	200 and up	-	-	

Source: Chung Nam Statistical Year Book, 1972.

B-426

SMALL–SCALE INDUSTRY GRANT

SOONG JUN UNIVERSITY ACTIVITIES

Grant Period: January 10, 1974 to January 9, 1975

A PROGRAM FUNDED BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

FINAL REPORT

SOONG JUN UNIVERSITY
SMALL-SCALE INDUSTRY GRANT

by

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and

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Contract No. AID/ta-c-1062

Industrial Development Division
ENGINEERING EXPERIMENT STATION
Georgia Institute of Technology

January 1975

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INTRODUCTION

On January 23, 1974, the Agency for International Development (AID) entered into Contract No. AID/ta-c-1062 with the Georgia Institute of Technology (GIT) whereby GIT was to make $45,000 grants for small-industry programs to two institutions located in different geographic regions of the world. This is the final (end-of-the year) report covering the activities jointly carried out by the Georgia Institute of Technology and one of the two selected grantee institutions, Soong Jun University (SJU) in Seoul, Korea.

In selecting the grantee institutions, the administration of the Georgia Institute of Technology used the following criteria as guidelines:

1. Suitability of the national macroeconomic framework for local business conditions.
2. Existence of practicing or potential entrepreneurs.
3. Community concern over unemployment.
4. Existence of potential markets for additional products.
5. Linkages (current or potential) with educational, financial, and business communities.
6. Quality of staff.
7. Institution's potential for utilizing grant effectively.
8. Potential multiplier effects.
9. Host government commitments.

After initial screening, SJU presented a proposal titled, "Establishment of a Small-Scale Industry Development Program," and this proposal was funded under the AID/GIT small industry grant program. The main objectives of the project are to generate employment outside metropolitan centers and to provide assistance to small-scale industries in selected areas. Some of the immediate results of this project are the following:

1. Study of the trends of small-scale industries during the first half of 1974.
2. Establishment of the Small-Scale Industry Information Center (SSIIC).
3. Provision of on-site technical assistance to 18 small-scale industries in the areas of Yongdung-po and Taejon.
4. Development of a simple test machine and tools for small-scale industries.

5. Presentation of training program to unskilled workers in 66 small-scale industries at the Yongdung-po Industrial Complex.
6. Training at Georgia Tech's Industrial Development Division (IDD) of staff members of SJU.
7. Provision of consultant services by IDD staff in Korea.
8. Preparation of an industrial engineering curriculum for SJU.
9. Request to and authorization by the government of Korea for SJU to establish an industrial engineering curriculum at the university.
10. Preparation of an audiovisual documentation of the first-year program by the Technology and Development Institute (TDI), East-West Center, Hawaii.
11. Research study on the population status of small-scale industries in the Yongdung-po area.

The following sections of this report describe in detail the background, objectives, and activities of the program and outline the results achieved and the conclusions reached by the project staff.

PROGRAM PLANS FOR YEAR I

Background

Soong Jun University was formed in 1970 when Soong Sil College united with Taejon College to form a new cooperative venture in the field of Christian education. Soong Sil College, in turn, was formed in Pyeng Yong (North Korea) in 1897 and reopened in Seoul in 1954, after being closed in 1938 during the Japanese occupation. Taejon Presbyterian College was founded in 1956 by the Southern Presbyterian Mission in the city of Taejon. At present, Soong Jun University has an enrollment of about 2,000 students, of which some 800 are in engineering.

The main campus is located in Seoul near the large industrial area of Yong-dung-po, which has a population of about 1.5 million inhabitants. The second campus at Taejon is also near a smaller industrial area with a population of about 450,000 persons. Recently, the government of Korea announced plans for the development of a new "science town" adjacent to the Taejon campus.

Immediately after Dr. Hahn Been Lee became president of Soong Jun University in March 1973, contacts were made by Mr. Ross W. Hammond, Chief of the Industrial Development Division, with Dr. Lee. As a result of these contacts, both institutions entered into an agreement of mutual cooperation on July 30, 1973.

After about six months of effort, a proposal for a grant in the amount of $45,000 was submitted by Soong Jun University to the Industrial Development Division which was approved by AID and GIT, and the SJU program was initiated. At the time the program was initiated, the organization structure shown in Figure 1 had been established at SJU.

The terms of the grant permitted the grantee to use half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The remainder of the funds was to be used by the grantee to obtain training and consultation from U.S. technical assistance organizations.

The Georgia Institute of Technology and the Technology and Development Institute, East-West Center, subsequently contracted with the grantee to provide training services and an audiovisual documentation of the project.

Dr. Hahn Been Lee, President of Soong Jun University, had the general administration of the different units at SJU, but the Integrated Development Center (IDC), under the direction of Dr. Yoon Bae Ouh, had the overall responsibility for the project as Counterpart Project Director. Mr. Ross W. Hammond, Chief of the Industrial Development Division, assigned Mr. Nelson C. Wall of his staff as Project Director for Georgia Tech's portion of the program.

Objectives

The general objective of the project is to develop a small-scale industries program at Soong Jun University. Through this program, SJU would (1) assist in generating employment in Korea, (2) provide technical assistance to small industries in the target areas, and (3) strengthen the relevancy of the educational program.

In order to assist in meeting the established objectives, two main areas of activity were established for the Georgia Institute of Technology staff: (1) training of selected SJU staff members both in Korea and the U.S.A. and (2) provision of on-site consultation by staff members of the Industrial Development Division of the Engineering Experiment Station at the Georgia Institute of Technology. It was further established that the project staff would assist SJU personnel in providing managerial, engineering, scientific, and technical assistance to selected small-scale industries in two defined geographic areas of the Republic of Korea.

Total Project Goals of the AID/ta-c-1062 Contract

At the start of the "Small-Scale Industry Grant Program" (Project A-1600) in 1974, the following goals were established by the Georgia Tech grant to be completed in the first year of the project:

1. Select and recommend to AID/Washington, TA/OST, four Lesser Developed Country (LDC) institutions from different geographic regions as candidate institutions.

2. Carry out preliminary visits to the selected institutions to develop and establish patterns of collaboration.

3. After final selection, assist the grantee in preparing final plan for the utilization of the grant funds in a manner best suited to achieve the stated objectives.

4. Award the grant once this was approved by AID.

5. Provide consultation to the grantee during the planned activity period.

6. Monitor and evaluate project at least twice during the following 12-month period.

7. Assemble base-line data study at the start of the project.

All of the established goals were met during the first year of the project plus several additional accomplishments which were listed in the introduction and will be amplified in the balance of this final report.

Program of Work

On the basis of the program of work which had been suggested in the original SJU proprosal, the project director established the following activities for the first program year, all of which were implemented:

1. Organization. On the basis of the existing organization at SJU (Figure 1), specific administrative units were to be designated to assume the responsibility for the portions of the program relating to research, service, training, and technical information. All programs were to be oriented to serving the small-scale industries of the selected areas.

2. Staff and Physical Plant. Depending on the different program units, it was necessary to allocate appropriate staff office space and equipment to assure the logistical support necessary to the implementation of the program. The staff needed to be selected with the assurance that the candidates were interested, capable, and motivated to perform the required tasks.

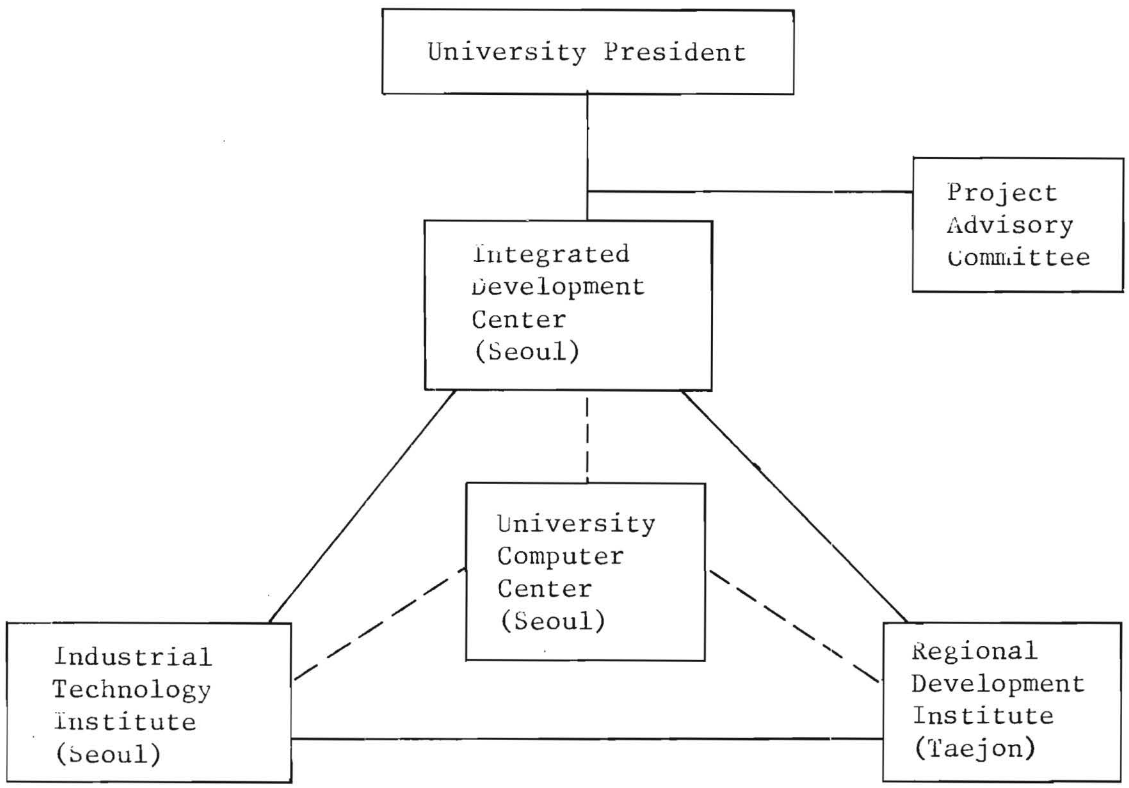
3. Project Policy. The program required a multi input-output system, but it had a basic theme -- stimulation of existing and new small-scale industries.

4. Program Areas. A program of work was designed to implement the following activities during the 12-month period:

a. Small-Scale Industry Information Center (SSIIC). The center was to be established during Year I of the program. It was to be the responsibility of the SSIIC to carry out surveys of small-scale industries in the two target areas and to generate the necessary basic data relevant to industry size, products, processes, major problem areas, and other governing factors. The center would also initiate a relevant collection of information from outside sources which would serve in the future as reference material. At the same

Figure 1

ORGANIZATIONAL STRUCTURE OF SOONG JUN UNIVERSITY
(January 1974)



time, the center would attempt to collect and disseminate management and technical information appropriate to the activities of small-scale industries. As part of the operation of the center, the gathered data would be cataloged, indexed, and stored in such a manner that it could be retrieved when needed.

b. Industrial Training and Education. A specific short-term training program was to be established for staff members of SJU, in an attempt to enhance the capability of the counterpart staff in the area of "real world" problems common to small-scale industries. The training program could be carried out in various forms as appropriate, including classroom activities, on-the-job training, guidance, consultation, industrial tours, and general business contacts, as needed. It was also planned to allow students to participate in this activity, so that they too could contribute to the development of small-scale industries in Korea.

c. University Training and Education. It had been established early in the project that since SJU was a technologically-oriented institution, it would be desirable to assist it so that it could expand its engineering programs to include industrial engineering. This would in the future allow the SJU graduates to participate more usefully in the industrial development of the nation. It was further planned that during the first year a curriculum would be generated and that this would then evolve into an "academic program" to be instituted as soon as the proper government authorization could be obtained.

d. Industrial Extension and Research Activities. Through this fourth main portion of the program of work, a linkage would be made between SJU and the existing small-scale industries in the SJU area of influence. It was planned to provide technical assistance to small-scale industries through an industrial extension service. When needed, applied research activities would also be incorporated in the portion of the program.

Use of Grant Funds by SJU

For the 1974-75 grant year, the grantee was funded in the amount of \$45,000. These funds were disbursed as shown on the following page.

Activities	Disbursed to SJU	GIT	TDI/E-W	Total
Personal Services	$11,100	$13,840[1/]	$2,000[2/]	$26,940
Travel				
International	4,810	6,485		11,295
Local	1,500			1,500
Material and Supplies	2,100	175		2,275
Conferences and Seminars	1,000			1,000
Dev. of Testing Machine	250			250
Testing Experiments	940			940
Printing	800			800
TOTAL	$22,500	$20,500	$2,000	$45,000

[1/] The GIT personal services include the authorized overhead and retirement charges.

[2/] The contract with the East-West Center was for a total of $2,000 for the preparation of audiovisual material.

SOONG JUN UNIVERSITY ACTIVITIES DURING PROGRAM YEAR I

Throughout the project year, the Soong Jun University staff carried out the bulk of the work programmed for the year. The following sections highlight some of the activities carried out by the SJU staff.

Description of Major Small-Scale Industries

During two quarters of the year, a study was prepared in an attempt to classify and describe the characteristics of Korean small-scale industries. The result of this activity was later incorporated into a separate report entitled Trends of Korean Small-Scale Industries During the Period 1974, which will be published by SJU early in 1975. A brief summary of some of the findings is presented as Appendix 1 of this report.

Small-Scale Industry Information Center

Once the information center was established, the SJU staff continued to operate it. They are at present increasing the collection while, at the same time, serving the needs of the SJU staff in the areas of management and technology. The collection has been classified into five major areas: (1) economic and statistical information, (2) professional material, (3) official material, (4) directory material, and (5) technical information.

Copies of catalog cards are presented in Figure 2 as examples of the classification presently being used. The collection is housed in a room in the Integrated Development Center (IDC) in Seoul. Pictures of the information center are shown in Figure 3.

Industrial Files

In order to achieve maximum effectiveness in the area of management and technical assistance, the IDC has developed a file system so that they may retain copies of all technical-management problems that are covered by the staff. At the time they request service, all companies must complete a standard form which is later filed for future usage. This allows the SJU staff to be able to answer questions instantly by phone or letter when they receive additional service requests from the registered enterprises. The forms are also being used in the basic research being conducted in the area of surveying the small-scale industries in Yongdung-po and Taejon.

Figure 2

SAMPLES OF CATALOG CARDS USED IN THE
SMALL-SCALE INDUSTRY INFORMATION CENTER

Sample 1. Author Card

B 0044	Norman K. Nicholson
	Panchayat Rai Rural Development and the Political Economy of village India Published jointly by the Rural Development Committee and South Asia Program, Cornell University, 1973

Sample 2. Title Card

B 0044	Panchayat Rai Rural Development & the Political Economy of village India
	Norman K. Nicholson Published jointly by the Rural Development Committee & South Asia Program, Cornell University, 1973

Figure 2
(Continued)

Sample 1. Author Card

라 0019		중소기업 협동조합 중앙회
		중소기업의 기술지도대책과 적정규모화 지원 시책방안.(식료품공업편)
		SEI POONG CO., INC

Sample 2. Title Card

라 0019		중소기업의 기술지도대책과 적정규모화 지원 시책방안. (식료품 공업편)
		중소기업 협동조합 중앙회
		중소기업 협동조합 중앙회
		SEI POONG CO., INC

Figure 3

SMALL-SCALE INDUSTRY INFORMATION CENTER

BULLETIN BOARD IN INFORMATION CENTER

PART OF SSIIC COLLECTION

Technical Assistance to Small-Scale Industry

This has been the most demanding portion of the program. During the year, the SJU staff serviced 18 industries in either Yongdung-po or Taejon. This represented some 78 visits by staff teams, and about 183 persons were involved to provide well over 200 hours of technical assistance. A complete listing of companies serviced and a description of each case is presented as Appendix 2 of this report.

Development of Testing Equipment and Industrial Tools

In the process of providing the necessary technical assistance to the industries in Yongdung-po and Taejon, the SJU staff identified the need for certain testing machines and industrial tools. The staff took it upon itself to develop a low cost test machine to be used in determining the tensile strength of moulded metal parts. Figure 4 presents a simple diagram of the testing machine developed by the staff of SJU.

During the provision of technical assistance to a manufacturer of small metal parts for handbags, another problem was encountered which was solved by designing and fabricating a simple shaping die. This industrial tool was also developed by the SJU staff and given to the company being serviced.

Technical Training for Unskilled Workers

A program was established by the SJU staff to provide technical training for unskilled workers in small-scale industries in the Yongdung-po Industrial Complex. The first program was presented during the period of October 11 to October 19, 1974. Five staff members were responsible for the instructional material and 40 persons participated. In summary, the program was as follows:

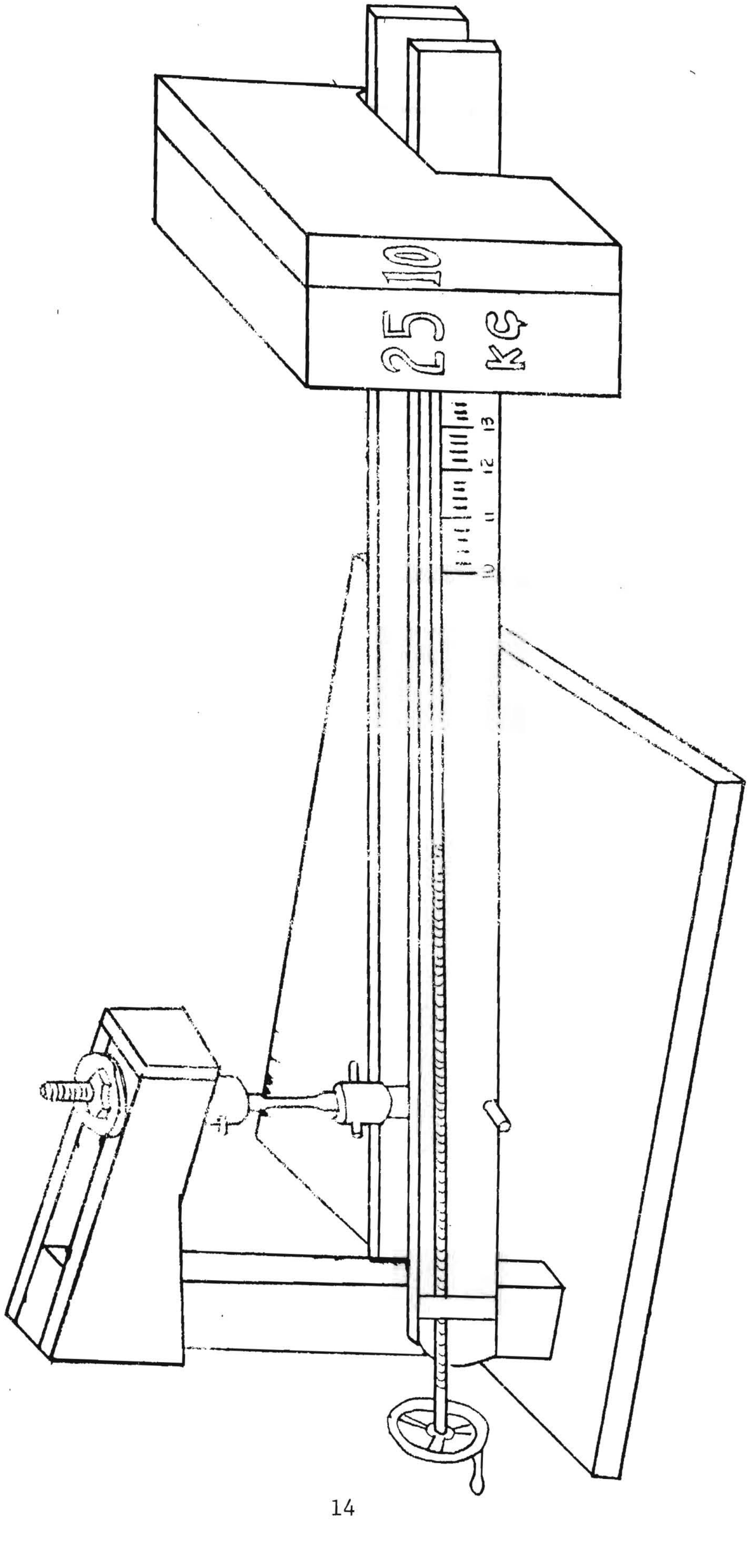
Day	Subject	Professor
Monday	Machine Material	Choe Yong-sik
Tuesday	Machine Tools	Yim Yong-ho
Wednesday	Electronics	Pak Chung-Kyu
Thursday	Production Management	Yun Jae-bok
Friday	Machine Tools	Yim Yong-ho
Saturday	Mechanical Drawings	Yun Jae-bok

Industry-University Cooperative Committee

In order to further unite the bonds between SJU and the companies that received technical assistance under this program, the Integrated Development

Figure 4

TENSILE STRENGTH TESTING MACHINE DEVELOPED BY SJU STAFF



Center created the Industry-University Cooperative Committee. Those companies that have implemented the recommendations made by the SJU staff and have achieved some success because of it are invited to join this committee. Membership cards are issued as well as certificates. At present, the following companies have been awarded the certificate:

Yongdung-po Mechanical Industrial Complex
Daega Steel Mill
Daewon Moulding Industrial Company
Jinhung Moulding Industrial Company
Samho Wood Manufacturing Company

A reduced copy of a blank certificate is shown in Figure 5.

Internal Organization

As indicated earlier in this report, an organization existed when this program was initiated and a diagram describing it was presented in Figure 1 of this report. During the year of operation, the Counterpart Project Director, Dr. Ouh, found it necessary to design a specific administrative unit to assume the responsibilities of research, training, education, information services, as well as industrial extension. The new organizational chart is shown in Figure 6.

Linkages

As a part of the project, it was anticipated that SJU would set up linkages with other institutions working in the same field of small-scale industry. By the end of 1974, a number of linkages had been established, as illustrated in Figure 7.

특별회원증서

숭종　　호

기업체명 :

주　　소 :

대표자명 :

위 업체는 숭전대학교와 미국 조지아 공과대학이 공동협력 하에 실시하고 있는 제　차년도 산학협동 업체로서 기술 및 경영분야에서 본 대학과 긴밀한 협력을 하고 있는 산학협동 특별회원임을 증명함.

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숭전대학교 종합개발원

원장

CERTIFICATE OF MEMBERSHIP

NO.

COMPANY NAME :

ADDRESS :

REPRESENTATIVE :

This is to cetify that the company named above has been designated a regular member of the Industry-University Cooperative Committee at Soong Jun University During the year of the Small-Scale Industry Technical Managerial Assistance Project, jointly conducted by Soong Jun University and the Georgia Institute of Technology with the support of the United States Agency for International Development.

CHIEF
INDUSTRIAL DEVELOPMANT DIVISION,
ENGINEERING EXPERIMENT STATION,
GEORGIA INSTITUTE OF TECHNOLOGY,
ATLANTA, GEORGIA

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Figure 5
CERTIFICATE OF MEMBERSHIP IN
INDUSTRY-UNIVERSITY COOPERATIVE COMMITTEE

Figure 6

ORGANIZATIONAL STRUCTURE OF
SOONG JUN UNIVERSITY
(January 1975)

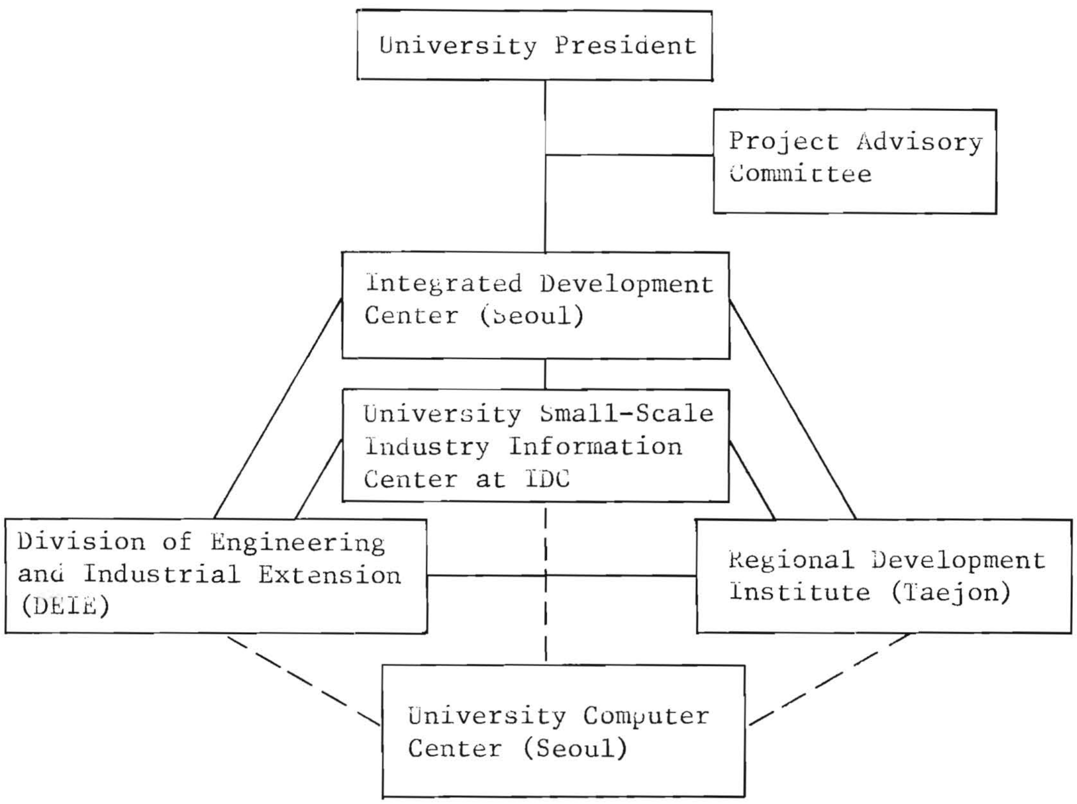
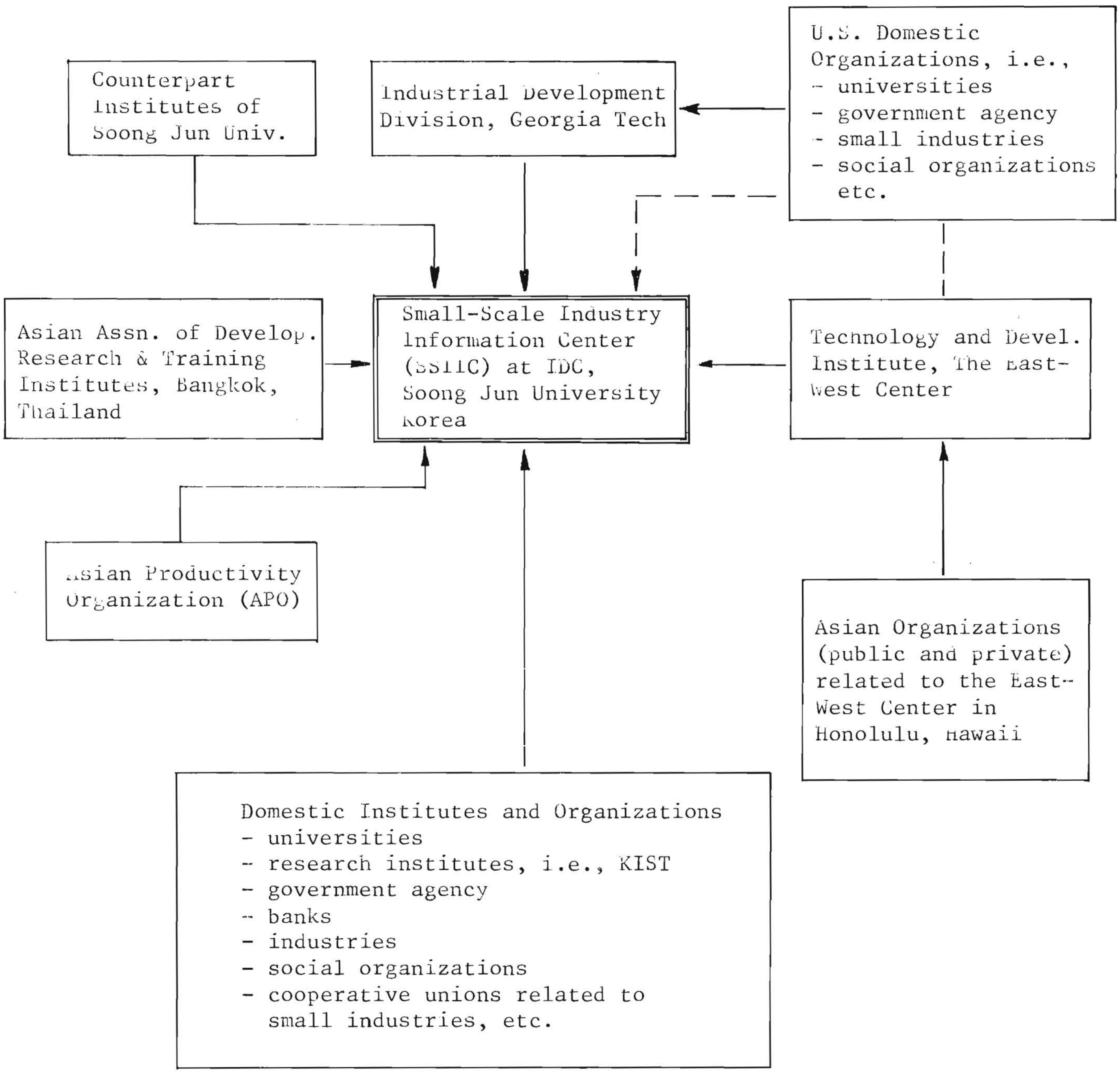


Figure 7

SJU LINKAGES WITH OTHER INSTITUTIONS



GEORGIA INSTITUTE OF TECHNOLOGY ACTIVITIES
DURING PROGRAM YEAR I

The activities of the Georgia Institute of Technology for the program year were initiated by Mr. Nelson C. Wall, Project Director, on April 3, 1974, when he and Mr. Richard Johnston visited Soong Jun University to provide on-site assistance in the project. They were later followed by Mr. Herbert Eller, Mr. Ben James, Mr. William Studstill, Dr. Vernon Crawford, Mr. Ross Hammond, Dr. David Fyffe, Mr. Fred Burian, and, again, Mr. Nelson C. Wall late in December 1974. Each of these staff members had a specific task assigned to him within the total goals of the project. Each was funded by this project or by other AID-sponsored programs. A brief summary of the individual activities follows in chronological order.

<u>April 3 - April 16 (Nelson C. Wall)</u>

As Project Director, Mr. Wall had the responsibility of setting up the GIT program of work for the year. This was done in consultation with the grantee Project Director, Dr. Yoon Bae Ouh. The four major areas of work had been defined as follows:

1. Small-Scale Industry Information Center
2. Industrial Training and Education
3. University Training and Education
4. Industrial Extension and Research Activities

Different IDD staff members were tentatively assigned to carry out individual tasks, and SJU staff members were also assigned to the project at that time. The resulting Project Plan was prepared as shown in Figure 8. While in Korea, Mr. Wall also provided general consulting services to the SJU staff, assisted in the selection of candidates for the training program, discussed the proposed industrial engineering curriculum, and visited many small-scale industries in both Yongdung-po and Taejon.

<u>April 3 - April 10 (Richard Johnston)</u>

This member of the IDD staff was assigned the responsibility of providing guidance to the SJU counterpart in setting up the Small-Scale Industry Information Center. In carrying out his assignment, Mr. Johnston prepared a document entitled <u>Provisional Procedures for the Operation of the Small-Scale Industry Information Center</u>, which appears as Appendix 3 of this report.

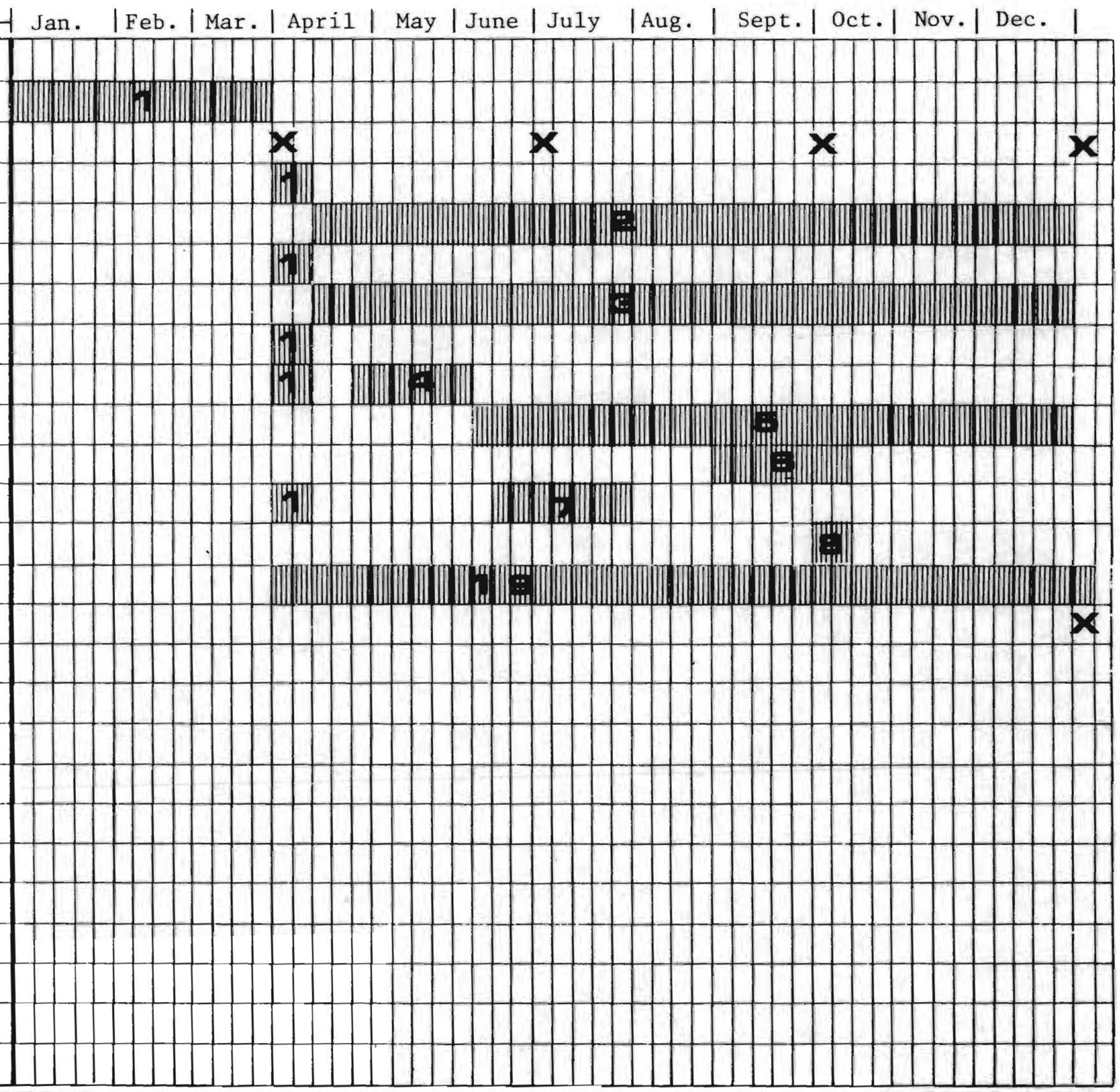
Project No. B-426

Project Title SIG Soong Jun University

Project Director N. C. Wall

PROJECT PLAN

Project Initiation January 10, 1974
Project Preparation (Soong Jun & IDD)
Quarterly Reports (IDD & Soong Jun)
Setting Up S.S. Ind. Information Center
Operation of S.S. Ind. Information Center
Univ. Training & Education (Start)
Preparation of I.E. Curriculum
Ind. Ext. & Research Activities (Start)
Setting up Industrial Extension Service
Operation of Industrial Extension Service
Identification of Manufacturing Opp.
Staff Training Program (3) in Atlanta
Audio Visual & Draft Final Report
Project Direction & Reporting
Final Report



LEGEND: STAFF

1 N. C. Wall
2 Jang-Choon Lee
3 Dr. Prince & Staff
4 Ben James & Staff
5 Yoon, Lim, Koo, Prince, Lee
6 Studstill & Staff
7 IDD-Atlanta Staff
8 R Hammond & Staff
9 Y. B. Ouh

Figure 8

This document is a guideline prepared to assist the SJU staff in developing the data collection that will be required by the Integrated Development Center staff to achieve the objectives of the total program. Mr. Jang-Choon Lee, Head of the SSIIC, worked with Mr. Johnston in developing a list of basic information that is available at IDD and which will be made available to SJU during the year.

April 21 -- June 8 (Herbert Eller)

As a member of the staff of Southern Technical Institute, Mr. Eller was called to join the IDD staff under another AID program which was funded by an AID 211(d) grant. Although not directly assigned to this program, Mr. Eller assisted the SJU staff in researching the need for a curriculum in industrial engineering. His contribution to this project was published as a separate report under the title of Curricula Research and Development, as part of the AID 211(d) grant for this year. The SJU staff, under the leadership of Dr. Clarence E. Prince, Associate Dean, Engineering College, and Dr. Kyung Gap Yang, Dean of the Engineering College, continued to work with this concept and later prepared a complete "academic program" which was submitted to the Minister of Education, Republic of Korea, for approval. On December 17, 1974, the authorization was granted by the Ministry of Education for the establishment of a new Department of Industrial Engineering at SJU.

April 28 - June 14 (Ben James)

This member of the IDD staff had the responsibility of assisting the SJU staff in setting up the "industrial extension service" to serve the small-scale industries in both Yongdung-po and Taejon. In carrying out his assignment, Mr. James covered the following two major activities:

1. Illustrate, by on-site examples, methods and techniques used by IDD in its industrial extension activities in Georgia.

2. Through individual discussions and by providing actual examples and sample documents, illustrate the administrative procedures of IDD's industrial extension program.

During this period of time, Mr. James worked very closely with the SJU staff at the Regional Development Institute (RDI) in Taejon and the Industrial Technology Institute (ITI) in Seoul. A description of all the technical assistance provided for the year by the SJU/IDD staff is presented in Appendix 2.

July 1 - August 2 (Counterpart Training)

Two senior members of the SJU staff were selected for training at IDD -- Mr. Hae Byung Lee, Associate Director of the Regional Development Institute (Taejon); and Mr. Jae Bok Yoon, Chairman of the Department of Mechanical Engineering (Seoul). In addition, Dr. Clarence Prince, Dean of Engineering (Seoul), attended part of the program in Atlanta. The training program, as designed by Mr. Robert Collier of the IDD staff, had various forms of training, including classroom activities, on-the-job situations, guidance and consultation, industrial tours, and several general contacts within the state of Georgia. The complete schedule of activities appears as Appendix 4 of this report.

September 8 - October 13 (William Studstill)

This portion of the program was a continuation of the work initiated by Mr. James earlier in the year. Mr. Studstill of the IDD staff had the responsibility of continuing the technical assistance services initiated by the SJU staff in the Yongdung-po and Taejon areas. A complete listing of industries served during this period, as well as a brief summary of each technical assistance case, is presented in Appendix 2. The small-scale industries served were attended by the SJU/IDD staff, and they are still being serviced by the SJU staff.

September 29 - October 13 (Dr. Vernon Crawford)

As Vice President for Academic Affairs of the Georgia Institute of Technology, Dr. Crawford made a project administration visit to Soong Jun University to further enhance the existing interaction between both institutions of higher learning. This activity was funded under Georgia Tech's AID 211(d) grant.

September 29 - October 13 (Ross W. Hammond)

During his stay, Mr. Hammond reviewed the status of the project and participated in planning the second-year grant activities. As part of his activity, Mr. Hammond provided administrative guidance to the counterpart staff and served as consultant to the project staff. He also was involved in the preparation of the audiovisual documentation that was being prepared at the time under a separate contract between SJU and the East-West Center.

October 7 - October 16 (Fred Burian)

Under a separate contract, SJU was able to obtain the services of the East-West Center in Hawaii to prepare an audiovisual history of the first year of activity. Mr. Burian of the East-West Center staff traveled to Korea and filmed an audiovisual tape presenting some of the most interesting cases of technical assistance service to small-scale industries. In the process, Mr. Burian also took several hundred still shots both in black and white and color film. Full details of this activity appear as part of the corresponding final report for Project A-1600. These audiovisual materials are available to interested organizations.

December 12 - December 18 (Nelson C. Wall)

This was considered the last on-site contact for the program year and, at that time, Mr. Wall and Dr. Ouh prepared the first draft of the final report which later evolved into this publication.

RESULTS AND CONCLUSIONS

As indicated in the introduction, many positive accomplishments have resulted during Year I of this program despite the very limited funding available. This section highlights the accomplishments for the year.

1. On May 9, 1974, there was a ceremony between Yongdung-po Industrial Complex companies and SJU. The purpose was to establish relationships between local industry and the SJU program. Later, on June 4, a similar ceremony took place at Taejon between the Taejon Chamber of Commerce and SJU. Both of these ceremonies were used as references at a later date by President Park as examples of university-industry interaction.

2. The staff at SJU was able to prepare a study entitled Trends of Korean Small-Scale Industries During the Period 1974. The study looks into the characteristics of Korean small-scale industries and attempts to classify and describe the different types of small-scale industries that were surveyed.

3. The Small-Scale Industry Information Center (SSIIC) was created, established, and operated as a viable portion of the first-year program. The center, which is presently in operation, has initiated the first serious collection of relevant industrial data in Korea. Not only is the center a depository of industrial data, it is also attempting to generate information valuable to future small-scale industrial programs.

4. On-site consultation was provided to small-scale industries. The staff at SJU provided well over 200 man-hours of direct technical assistance service plus nearly 100 man-days of IDD staff time. As a result, 18 small-scale industries were serviced and their specific problems were resolved.

5. A simple testing machine and industrial tools were designed and developed. This activity would be classified as technology application or adaptive technology. Two main accomplishments should be mentioned: (a) the design, construction, and application of an inexpensive tensile tester; and (b) the design, construction, and application of a simple die or industrial tool.

6. A meaningful training program was especially designed for and presented to the senior staff at SJU. This was the first of a series of training programs to be offered during the life of this project.

7. Unskilled workers in Korea were trained. This was performed by the SJU staff, and they were successful in training about 40 unskilled laborers in the Yongdung-po Industrial Complex.

8. Consulting services were provided by the IDD staff. In addition to the time utilized in the provision of technical assistance to small-scale industries, the IDD staff had time available to provide on-site consultation in such areas as curriculum planning, project development, project administration, operations, logistics, report preparation, and many others.

9. An industrial engineering curriculum was developed. This capacity was funded under the related 211(d) grant program but, nevertheless, it was the first step toward the establishment of the Department of Industrial Engineering as part of the College of Engineering. As a direct result of this effort, the Ministry of Education authorized the establishment of the Industrial Engineering Department at SJU late in December 1974.

10. An audiovisual history of the program was prepared. Again, under a separate contract, SJU documented the case history of the first-year program through the efforts of staff members of the East-West Center. The resulting video tape and photographic collection provide a concise history of the highlights of the program of technical assistance to small-scale industries in both Yongdung-po and Taejon.

11. The staff at SJU spent much time compiling demographic and industrial data on selected areas of Korea, as well as conducting research studies on small-scale industries in the Yongdung-po area. These studies will be published by SJU at a later date.

12. During the program year, internal organization changes evolved and, as a result, a new organization structure had emerged by the end of the year. It is interesting to note how this was accomplished totally by the SJU staff, as they went further into the program year.

13. During the grant year, both the SJU staff and the IDD staff had the opportunity of working together and getting to know new problems which needed solution. The knowledge gained of real world problems and solutions will be of direct value in staff development and in feedback to the university education curricula.

During the year, not only have these achievements taken place, but also the small-scale industries in the target areas have been provided with assistance previously unavailable to them. As the project progresses and more scientific methods are put into practice, it is expected that even more effective implementation will take place.

As a by-product, this program will be reflected in the student curricula at SJU, and the graduates of the "new" programs will be more effective in the progressive and harmonious development of small-scale industries in Korea.

Appendix 1

TRENDS OF KOREAN SMALL-SCALE INDUSTRIES DURING THE PERIOD 1974: SUMMARY OF FINDINGS

Appendix 1

TRENDS OF KOREAN SMALL-SCALE INDUSTRIES DURING THE PERIOD 1974

Summary of Findings

Definition of Small-Scale Industries

The concept of small-scale industries is not clear cut but rather relative. An enterprise is defined as a small or medium industry in accordance with its business scope, value of total assets, and number of employees.

These criteria, necessary for defining small-scale industry, vary in compliance with economic and social conditions of a country. The definition and classification of small-scale industries in Korea differ in the medium-industry basic law, medium-industry cooperative act, and medium-industry bank act.

The medium-industry cooperative act defines as medium industry a company which hires:

1. Below 200 permanent workers and holds total assets of less than 50 million won engaging in manufacturing industry as its main business, and
2. Below 300 permanent workers and holds total assets less than 50 million won engaging in mining.

Either one of these provisions is adopted as a medium number of firms, employees, production, and export which are introduced in the following page as Table 1.

Shift of Korean Small-Scale Industry Development

During the period 1960-1970, important changing features included number of companies, number of employees, production cost, and amount of additional value.

First, the general goal of small-scale industries is becoming bigger in scale, but its tempo is slower than that of large-scale industries. Thus, the industrial gravity decline of small-scale industries is gradually growing, as presented in Table 2 and Table 3.

Second, the gravity decline is getting bigger as shown by the number of companies, number of employees, production cost, and additional value. This phenomenon indicates the differences of managerial effect are most distinct by company scale.

Table 1

DEFINITION OF MEDIUM INDUSTRY

Law		Industry Group	Number of Employees	Total Assets (Won)
1.	Medium Industry Basic Law	Manufacturing	Below 200	Less than 500 million
		Mining	Same	Same
		Transportation	Same	Same
		Comm. & Serv.	Below 200	Less than 10 million
2.	Medium Industry Cooperative Act	Manufacturing	Below 200	Less than 50 million
		Mining	Below 300	Same
3.	Medium Industry Bank Act	Manufacturing	Below 200	Less than 30 million
		Mining	Below 300	Same
		Transportation	Same	Same

Note: Either one, number of employees or total assets of these three provisions, is criteria in the medium industry basic law, the medium industry cooperative act, and the medium industry bank act.

Table 2

SHIFT OF SMALL-SCALE INDUSTRY GRAVITY
(As of 1960)

Division	Entire Operations(a)	Small-Scale Industry(b)	b/a (%)
1. Number of companies	15,024	15,067	99.1
2. Number of employees	275,254	215,077	78.1
3. Production Cost (million won)	59,735	39,899	66.8
4. Additional Value (million won)	22,295	14,789	66.3

Table 3

SHIFT OF SMALL-SCALE INDUSTRY GRANT
(As of 1970)

Division	Entire Operations(a)	Small Scale Industries(b)	b/a (%)
Number of companies	24,114	23,406	97.1
Number of employees	861,041	421,558	49.0
Production cost (million won)	1,334,514	403,734	29.5
Additional value	549,793	156,626	28.5

Source: Tendencies Toward a Rational Industrial System in Korea, published by the Small-Scale Industry Bank.

Third, considering industry fields, the gravity decline of small-scale industries shows a slow-motioned shift condition in light industry, while remarkable decline phenomenon appears in heavy industry. Meanwhile, the labor productivity of small-scale industries during the period 1960-1970 showed a remarkable increase.

Table 4

SHIFT OF LABOR PRODUCTIVITY
OF SMALL-SCALE INDUSTRY

Division	Yearly Production Amount per Employee	Additional Value Per Employee
1960(a)	354.7	131.5
1970(b)	669.9	268.1
(b-a)/a(%)	88.9	103.9

(unit: 1,000 won)

Note: Based on stable price of 1965 by producers' sales price.

The market share ratio of industries by type of product is shown in Table 5. Superior field of the small-scale industries with over 50 percent of market share ratio are mostly light industries depending on labor such as shoes, clothes, accessories, furniture, printing, publication, and leather.

Meanwhile, in heavy industry non-metal minerals and metal machine equipment show an increasing trend in manufacturing forward goods, while in light industries textile and clothes show an expansion of market share.

Table 5

SHIFT OF PRODUCTIVITY DIFFERENCE
BETWEEN SMALL-SCALE INDUSTRY AND
HEAVY INDUSTRY BY INDUSTRIAL FIELD

Division	Light Industry		Heavy Industry	
	1960	1970	1960	1970
Production Amount per Employee	60.2	51.3	85.4	39.1
Additional Value per Employee	56.8	43.8	123.5	43.4
Wages	71.7	68.4	76.4	62.4

Note: Large-scale industry is 100.

Source: Tendencies Toward a Rational Industrial System in Korea (published by the Small-Scale Industry Bank).

The export achievement of small and medium industries reached less than 23 million dollars in 1964, and 448 million dollars in 1971. The gravity of small-scale industrial goods is 37.3 percent of the total amount of export during the period January to October 1970, and it occupies 42.6 percent of total industrial goods in exports.

Despite the fact that the entire share of market of small and medium industries shows a tendency of loss, this contrasting phenomenon of expanding export amount proves small and medium industries could occupy a superior place in competitiveness in overseas markets which consist of different capital structure. Essential prices of small-scale industries are different from domestic large-scale industries.

Table 6

SHIFT OF FORWARD GOODS OF SMALL-
SCALE INDUSTRIES BY KINDS OF MANUFACTURING
Unit: Million Won
(US$1 = 400 Won)

Classification	1963 Amount	1963 Ratio (%)	1970 Amount	1970 Ratio (%)
Food and Beverage	23,751	24.8	90,534	22.7
Textiles and Wearing	17,938	18.8	87,447	21.9
Wood and Furniture	5,496	5.8	19,438	4.9
Paper and Printing	7,176	7.5	28,352	7.2
Chemicals	16,654	17.5	58,383	14.6
Non-Metallic Minerals	3,907	4.1	26,474	6.6
Basic Metal	5,746	6.0	14,398	3.6
Machinery and Equipment	12,057	12.6	63,147	15.8
Others	2,701	2.8	10,888	2.7
Manufacturing	95,427	100.0	399,061	100.0

Source: Bank of Small and Medium Industries.

Table 7

SHIFT OF EXPORT
ACCOMPLISHMENT OF SMALL-SCALE INDUSTRY
Unit: US$1,000

Classification	1964	1965	1966	1967	1968
Total Export (a)	120,851	180,450	255,251	366,753	500,408
Manufacturing Export (b)	62,322	112,372	159,684	251,175	386,940
Export by Small-Medium Industry (c)	23,683	41,597	71,207	101,559	157,082
c/a (%)	19.0	23.0	27.8	30.2	31.4
c/b (%)	36.0	37.0	44.5	44.4	40.6

Source: Bank of Small and Medium Industries.

Appendix 2

SUMMARY OF TECHNICAL ASSISTANCE CASES

Appendix 2

SUMMARY OF TECHNICAL ASSISTANCE CASES

Area	Company	Number of Visits
Seoul	Yeong Dung Po Industrial Site	4
Seoul	Tae Won Cast Iron Company	9
Seoul	Tae Ga Ironworks Company	7
Seoul	Sam Ho Wood Machine Company	8
Seoul	Sam Jin Industrial Company	4
Seoul	Jim Hung Cast Iron Company	9
Seoul	Jung Poong Industrial Company	1
Seoul	Sam Sin Sewing Machine Company	5
Taejon	Shin Sung Paper Mill Company	14
Taejon	Kook-Ri Machinery Company	3
Taejon	Doong-Mi Chemistry Company	1
Taejon	Shin-Kwang TenTile Company	2
Taejon	Nam-Ii Machinery	3
Taejon	Hae-Ryuk Machinery Works	3
Taejon	Moon-Kwang Towel Company	2
Taejon	Dae-Won Paper Mill	1
Taejon	Nam-Sum Machinery	1
Taejon	Anjon Bicycle Manufacturing	1
	Total	78

Case No. 1 Main Product: Casting Moulds

Municipality: Puchon City

Brief Description of Problem: In producing moulds, the company has encountered the following problems:

1. Inferior end-product
2. Poor production management
3. Desire to expand sales and, if possible, enter export market

Applied Solution: The manufacturing process was studied and an analysis was made of the sands used, pouring procedures, cupola temperature, and other important factors. Once completed, the study provided the company with information on how to run test analyses and other manufacturing procedures to improve the final product. As a result, rejects have been reduced from 15 percent to about 5 percent.

Case No. 2

Main Product: Hammer Mill

Municipality: Seoul

Brief Description of Problem: This manufacturer wishes to export his products and wishes to obtain more modern technology for his process.

Applied Solution: As a result of the study, it was determined that the company must improve the quality of its product if it is to enter the export field. It was suggested to company management that they also change some of their manufacturing procedures and, at present, the company is implementing the recommendations. Assistance is still being provided.

Case No. 3 Main Product: Machine Manufacturer

Municipality: Seoul

Brief Description of Problem: This manufacturer of woodworking machines was having problems with the quality of his products.

Applied Solution: A technical team examined the manufacturing procedures and has made a series of recommendations to assure better quality control. It is anticipated that the company will be able to export in the near future, once it has implemented all of the recommendations.

Case No. 4 Main Product: Machine Parts

Municipality: Puchon City

Brief Description of Problem: Much as in previous cases, this manufacturer also was in dire need of improving his product quality.

Applied Solution: The technical team determined that jigs were needed and these were designed for the company. Quality control recommendations were also made, as well as the establishment of standard time. As a result, quality has improved and the technical team will continue to work with the company.

Case No. 5 Main Product: Mouldings

Municipality: Puchon City

Brief Description of Problem: The company recognized the need to improve the quality of its moulds and were also interested in the possibility of reducing rejects.

Applied Solution: Moulding sands were examined and cast pieces were tested for tensile strength. As a result of the study, suggestions have been made and implemented which have reduced losses or rejects to under 8 percent of production. Technical assistance is still needed and is being provided by the staff.

Case No. 6

Main Product: Automotive Shock Absorbers

Municipality: Seoul

Brief Description of Problem: The company has been having problems in determining oil pressure within the shock absorbers and in controlling quality.

Applied Solution: The assigned team found that the company lacked complete manufacturing drawing of all parts, as well as appropriate testing equipment and testing methods. During the study, it was also determined that simple tools were needed in the operation, such as jigs and fixtures. Recommendations were made to the manufacturer, and these are being implemented to resolve the above problems. It is anticipated that the quality of the shock absorbers will be improved through these recommendations.

Case No. 7 Main Product: Sewing Machines

Municipality: Puchon City

Brief Description of Problem: The manufacturer wished to establish a system whereby he could test incoming raw materials and components. He also wanted to improve the manufacturing of the frames of the sewing machines.

Applied Solution: A complete study of the plant was carried out and, in the process, three alternatives for manufacturing of the frames of the sewing machines were established. As part of the project, a system was established to test the incoming components. As a result, productivity has been increased and the quality has been enhanced.

Case No. 8 Main Product: Paper

Municipality: Taejon

Brief Description of Problem: Several problems plagued this company:

1. Poor operation of the brush rollers
2. Loss of up to 15 percent of the fibers in the water
3. Poor distribution of the wet material
4. Technical problems with the hot water

Applied Solution: A study was made of the company and the problems indicated. A solution was given to the brush roller problem by changing the dimensions of both the shaft and the roller. The loss of fiber was also resolved by a cam or link system. A study was made of the distribution roller and this too was solved. In relation to the hot water problem, it was determined that the boiler was insufficient for the demand and it was recommended that this be changed.

Case No. 9 Main Product: Milling Machines

Municipality: Taejon City

Brief Description of Problem: The company wanted to improve its quality control and wanted to establish testing procedures for the milling machines.

Applied Solution: The technical team studied the operation and made recommendations for a testing procedure, as well as testing of manufactured parts. Recommendations were also made for standardization of operations, materials handling, and quality control. The company has now implemented all of the recommendations.

Case No. 10

Main Product: Milling Machines

Municipality: Taejon City

Brief Description of Problem: This small company was having manufacturing problems in the process of making their milling machines.

Applied Solution: Standard manufacturing drawings were made of all parts and components of the milling machines, and these were classified and numbered. Testing procedures were established and recommendations were made for jigs and test tools. The company has now implemented testing procedures and the problem appears to be solved.

Case No. 11 Main Product: Milling Machines

Municipality: Taejon City

Brief Description of Problem: The manufacturer was having a problem with the surface hardening of the gears and shafts used as components of the milling machines.

Applied Solution: A study was made of the heat treatment process and changes were recommended. At present, tests are being conducted on parts that have been heat treated under the new process.

Case No. 12 Main Product: Farming Machines

Municipality: Taejon City

Brief Description of Problem: This manufacturer of threshing machines was having a problem in his production line in the process of assembling his equipment.

Applied Solution: The study team analyzed the operation and suggested changes in the flow system. It was also suggested that parts be numbered and stored in that manner, as well as development of jigs and test tools. The recommendations have been implemented by the company and production has improved substantially.

Case No. 13 Main Product: Bicycle Gears

Municipality: Taejon City

Brief Description of Problem: This manufacturer has been having a problem with quality control.

Applied Solution: After studying the operation, recommendations were made to improve manufacturing procedures relating to sizes, surfaces, and die forgings. In the process, jigs were also recommended as well as testing equipment and possible redesign of the gear track. The company has implemented the recommendations and testing procedures are now being performed.

Case No. 14 Main Product: Textiles

Municipality: Taejon

Brief Description of Problem: This small manufacturer was having problems in dyeing his fabrics.

Applied Solution: A study was made and a suitable catalytic surface agent was recommended to activate the dyeing process of the fibers. Recommendations have been implemented and they have improved the process.

Case No. 15 Main Product: Plastic Containers

Municipality: Taejon

Brief Description of Problem: The manufacturer was interested in coloring materials for his plastic containers.

Applied Solution: The case is still under study.

Case No. 16 Main Product: Towels

Municipality: Taejon

Brief Description of Problem: This company wished to improve the surface and smoothness of its towels.

Applied Solution: It was determined by the technical team that an emulsion of liquid parafin will be a suitable surface agent during the dyeing process which would improve the surface of the towels. The recommendations were implemented and have proven successful.

Case No. 17 Main Product: Paper

Municipality: Taejon

Brief Description of Problem: The company was facing two basic problems:

1. Manufacturing of chemical pulp from broad-leave trees
2. Improving the wetting strength of the paper

Applied Solution: The first problem is still under study. The second was resolved by the addition of melamine resident to the pulp.

Case No. 18 Main Product: Industrial District

Municipality: Yongdung-po

Brief Description of Problem: The administration of the industrial district wished to provide technical assistance to the small-scale industries located there.

Applied Solution: The technical staff at SJU started working with the industries at Yongdung-po and have assisted many of them during this year. The Industry-University Cooperative Committee has been established.

Appendix 3

PROVISIONAL PROCEDURES FOR THE OPERATION OF THE SMALL-SCALE INDUSTRY INFORMATION CENTER

PROVISIONAL PROCEDURES FOR THE OPERATION OF THE SMALL-SCALE INDUSTRY INFORMATION CENTER

INTEGRATED DEVELOPMENT CENTER
SOONG JUN UNIVERSITY
SEOUL, KOREA

by

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PREFACE

These procedures are written to provide guidelines of a basic nature for the establishment and operation of the Small-Scale Industry Information Center (SSIIC) at Soong Jun University (SJU), Seoul, Korea. Since these procedures are expected to be adjusted from time to time, the addition of the word "Provisional" in the title is appropriate because only after a suitable period of operation will the faults of these procedures be revealed requiring changes for better performance.

Many of these procedures were developed from the publication of the Basic Data Branch entitled INFORMATION SUPPORT FOR DEVELOPMENT AGENCIES and from the LIST OF SUBJECT HEADINGS FOR INDEXING AND FILING INDUSTRIAL DEVELOPMENT COLLECTIONS, published by the American Industrial Development Council.

OBJECTIVES

The objectives of the Integrated Development Center (IDC) are to achieve the effective performance between the Georgia Institute of Technology (GIT) and Soong Jun University (SJU) of the common project, "Employment Generation Through Stimulation of Small-Scale Industry." This performance will be achieved by delivering mental and material services and facilities to businessmen of small industries situated in the area surrounding the Seoul and Taejon campus. The purpose of this delivery is to generate productive interaction between the university and the community.

The objective of the Small-Scale Industry Information Center (SSIIC) will be to provide the information required by the staff of IDC to achieve the objectives of IDC.

TYPES OF INFORMATION

The types of information required by the staff of IDC to achieve their objectives are as follows:

1. Economic and Statistical Measures
2. Professional Material
3. Official Material
4. Directory Information
5. Technical Information

The Basic Data publication INFORMATION SUPPORT FOR DEVELOPING AGENCIES on page 8 and 9 describes these publications in the following manner:

ECONOMIC AND STATISTICAL MEASURES

This category covers measures of income, population, education, and other characteristics of the area and of economic activity. Up-to-date information is essential. Trends have to be identified, however, so that a series of data should be available. Moreover appropriate data must be accessible to enable the developer to make comparison between the community and the state, the region, and the nation.

PROFESSIONAL MATERIALS

This group encompasses those works concerning the principles, theory, methods, and techniques underlying the various phases of community development. It includes, for example, monographs and reports relating to site selection, capital budgeting, plant location, and leadership involvement. Publications concerning local problems and local characteristics must be available; waterfront development has great importance, for example, to a port town or a river town. Access must be provided to basic works, the so-called landmark studies. In addition, there must be some means whereby the individual developer is informed of significant new studies.

OFFICIAL MATERIAL

Appropriate regulations, laws, and ordinances of local, state, and federal agencies belong in this classification. Local records such as those concerning building permits, taxation, and the school system are particularly significant. On occasion the need occurs for copies of standards and codes adopted by national associations and agencies. It is important that the current version of an official document be available as well as an indication of pending changes.

DIRECTORY INFORMATION

Directories or files that will identify people, agencies, associations, companies, and products are covered here. Again, the information must be up-to-date, and in some cases it must be extensive enough to provide such data as balance sheet detail for a company or specifics of the program of a federal agency.

TECHNICAL MATERIAL

Reports and studies of a scientific and technical nature are included in this classification. Developers seek information on soil analysis, water quality, and similar topics.

In its physical appearance this information varies as much as it does in subject content. It is found in books, technical reports, pamphlets, journal articles, newspapers, maps, dealers' catalogs, correspondence, minutes, interview notes, questionnaire returns, and other miscellaneous forms. It is published by commercial firms, by academic institutions, and by government agencies. Much of it is unpublished, however, and extremely difficult to identify. Even worse, some of it is not presently available and can be obtained only by a specially designed survey or study.

Reviewing quickly and somewhat superficially the five subject categories of material, the physical format is characteristically as follows: Economic and statistical measures are found in both published and unpublished forms with most of the local, up-to-date material being unpublished. Professional materials usually are published. Official materials pertaining to the locality may be unpublished, but the state and national ones are usually published. Although directory information is usually published, it is kept current by handwritten notes. Technical information is usually published although it is often obtained by consultation with a specialist.

LIBRARIANS AND PROGRAMMERS

The proper operation of a data center is not a simple matter. The philosophy of librarianship and the techniques of selection, acquisition, classification, and reference are not generally known. Librarians are trained in these concepts and have experience in implementing library management philosophy and techniques. To insure the success of SSIIC, a university trained librarian should be on the staff to provide professional advice. Having a librarian available for consultation for some period each day or for a few hours each week is necessary to achieve the objectives of SSIIC.

If computer facilities are to be available in the future, and it is desired that the publications be registered therein, it is necessary to have a programmer involved from the beginning of the operation of SSIIC so that proper forms and procedures can be devised to insure compatibility between the data center and computer center.

SOURCES OF INFORMATION

Since no one library can possibly supply all of the publications required by its patrons, it will be necessary for the person in charge of SSIIC to go forth into the community to identify and locate publications useful to users of the SSIIC. Possible sources are such organizations as KIST, the Chambers of Commerce (Korean Chamber of Commerce and Korean Junior Chamber of Commerce), banks (Korea Exchange Bank, Korean Medium Industry Bank), other college and university libraries in Korea, and the commercial attaché in foreign embassies and consulates.

The SSIIC should acquire only those publications which are unavailable on a reasonable basis and which are vital and necessary to the staff. Duplication of available publications is costly and needs to be avoided. The person in charge of SSIIC should most carefully choose publications to determine suitability, usefulness, timeliness, and possible duplication.

Although publications will be acquired from many sources, primary sources will be from the Public Documents Center, from other colleges and universities, from development organizations, from international groups such as UNIDO, OECD, and ILO, and from GIT. The person in charge of SSIIC will select publications to acquire by examining bibliographies, by reading relevant publications and noting pertinent publications that quite likely can be obtained at no or little cost, by talking to staff members and others who may know of useful publications, and by being constantly alert to potentially useful publications.

A record of the location at other organizations of publications highly useful to SSIIC should be compiled and made available to the staff.

OPERATIONAL PROCEDURES

OBJECTIVE

The objective of these procedures is to arrive at a method to place all publications on the shelves in a systematic and orderly manner so that each publication has one definite shelf location.

RETRIEVAL OF PUBLICATIONS

To locate a publication on the shelves, follow these procedures:

1. If you know the author, find the author card in the card catalog. Read the number in the upper right corner. This number (0001, 0142, or some such number) will be the shelf location number, and the publication will be on the shelf at its numerical series location.
2. If you know the title, find the title card in the card catalog. Read the number in the upper right corner and follow procedures outlined above.
3. If you know neither the author nor the title, look at the cards in the subject card section of the card catalog. Each publication will appear on one or more subject cards. Look at subject cards until you find a publication fitting your needs. Read the number in the upper right corner and follow procedures outlined above.

LOCATION ON SHELVES

Since only a relatively small number of publications will be acquired by SSIIC, only a simple system is required. This system needs a few cards for each publication -- an author card, a title card, one or more subject cards, and one card for GIT.

Pamphlets, books, and directories will be assigned an accession number which will indicate the shelf location for the publication.

Periodicals will be arranged on the shelves alphabetically according to their titles.

Maps will be housed in verticle files or other suitable place and arranged by titles in alphabetical order.

Periodicals will be housed in pamphlet boxes and arranged on the shelves by titles in alphabetical order and eventually according to its Cutter-Sanborn number.

Pamphlets, books, and directories will be housed in pamphlet boxes and arranged on the shelves in order of accession number.

PROCESSING PUBLICATIONS

1. If the publication is a periodical, fill out cards for the card catalog. File one card in the title section according to its alphabetical order. File a second card in a separate file that lists all periodicals. When the need arises for Cutter-Sanborn numbers, place it in the upper right corner of the title page of the publication. Send the third card to GIT.

2. If the publication is a pamphlet, book, or directory, fill out cards for the card catalog. File one card in the author catalog according to its alphabetical order. File one card in the title catalog according to its alphabetical order.

3. For all publications determine in what subject category the publication falls. Determine the subject category from one or more subject headings chosen from the master list of subject headings used by SSIIC. File these subject cards in the subject file of the card catalog according to their alphabetical order.

For sample cards see following pages

AUTHOR CARD

Author	
Title	
Publisher	Place
Date	Pages
Subjects	

TITLE CARD

TITLE	
Author	
Title	
Publisher	Place
Date	Pages
Subjects	

SUBJECT CARD

Subject	
Author	
Title	
Publisher	Place
Date	Pages
Subjects	

Whitlatch, George I 0001

Industrial Sites

Industrial Development Division, Georgia Institute of Technology, Atlanta, Georgia, U.S.A.

1970 72 p.

Industrial Sites

INDUSTRIAL SITES 0001

Whitlatch, George I

Industrial Sites

Industrial Development Division, Georgia Institute of Technology, Atlanta, Georgia, U.S.A.

1970 72 p.

Industrial Sites

PERIODICAL CARD

Title

Publisher Place

Frequency Cost

Renewal Date

Subjects

KOREA TODAY

Department of Commerce, Republic of Korea, Seoul, Korea
Monthly 400 Won January

Economic Conditions

ECONOMIC CONDITIONS

KOREA TODAY

Department of Commerce, Republic of Korea, Seoul, Korea
Monthly 400 Won January

Economic Conditions

PERIODICAL CARD-SUBJECT

SUBJECT

Title

Publisher Place

Frequency Costs

Renewal Date

Subjects

FILING CARDS

Pamphlets - Books - Directories

1. One card to author file.
2. One card to title file.
3. One or more cards to subject file.
4. One card to GIT.

Periodicals

1. One card to periodical file.
2. One card to title file.
3. One or more cards to subject file.
4. One card to GIT.

SUBJECT HEADINGS ASSIGNMENT

To begin assignment of subject headings, a basic list of terms has been selected for use. These terms come from the AIDC's LIST OF SUBJECT HEADINGS FOR AN INDUSTRIAL DEVELOPMENT ORGANIZATION. As the collection grows, additional headings may be chosen from the larger list identified as "Headings for General Material" in the AIDC list. The subject headings chosen for the first year, however, should be selected from the list provided. Rules for the selection of headings are listed in the first part of the appended AIDC list. See pages 1, 2, and 33.

GIT CARDS

To assist SSIIC in developing its card catalog, one author card will be sent to Richard Johnston at Georgia Tech. This card can be examined at Georgia Tech, and, if required, suggestions can be made to change the card to make it more effective. These cards will be filed at GIT so that IDC personnel in training at GIT can be aware of the collection at SJU and so that GIT personnel going to Korea can better plan on their informational requirements needed at IDC. Persons from other counterpart countries can also see the types of information being collected by fellow counterpart organizations.

ACCESSION NUMBER SCHEDULE

0001	0029	0057	0085	0113
0002	0030	0058	0086	0114
0003	0031	0059	0087	0115
0004	0032	0060	0088	0116
0005	0033	0061	0089	0117
0006	0034	0062	0090	0118
0007	0035	0063	0091	0119
0008	0036	0064	0092	0120
0009	0037	0065	0093	0121
0010	0038	0066	0094	0122
0011	0039	0067	0095	0123
0012	0040	0068	0096	0124
0013	0041	0069	0097	0125
0014	0042	0070	0098	0126
0015	0043	0071	0099	0127
0016	0044	0072	0100	0128
0017	0045	0073	0101	0129
0018	0046	0074	0102	0130
0019	0047	0075	0103	0131
0020	0048	0076	0104	0132
0021	0049	0077	0105	0133
0022	0050	0078	0106	0134
0023	0051	0079	0107	0135
0024	0052	0080	0108	0136
0025	0053	0081	0109	0137
0026	0054	0082	0110	0138
0027	0055	0083	0111	0139
0028	0056	0084	0112	0140

To use the accession number schedule, select the first available number and assign it to the publication in hand. Place this number in the upper right corner of the publication. Draw a line through the number chosen from the accession number schedule, and use the next number for the next publication.

<u>Example</u>

~~0001~~
~~0002~~
~~0003~~
0004

If the first three publications were assigned numbers 0001, 0002, 0003, then the fourth and next publication would receive the number 0004.

SUBJECT HEADING
USED BY THE SMALL-SCALE
INDUSTRY INFORMATION CENTER

Advertising

Agriculture

Biographical Sketches

Climate

Communication Media: Radio, Television, Press Facilities

Community Attitudes

Company Information

Consolidations and Mergers

Construction

Cost of Living

Cultured Facilities and Programs

Directories

Economic Conditions and Economic Industry

Educational Facilities

Employment and Unemployment

Financial Data

Financial Institutions

Forecasts and Trends

Geography: Characteristics and Distinctive Features of An Area

Government: Farm Organization

Government Regulations

Government Services

Health Facilities and Services

Highways and Sheets

History

Housing and Residential Areas

Income

Industrial Buildings

Industrial Districts

Industrial Sites

International Aspects

Labor Force

Labor Relations

Labor Unions

Land Use

Manufacturing

Market Surveys

Medical Facilities and Services

New Plants and Expansions

Organizations and Associations

Plant Layout

Population

Products

Public Utilities

Raw Materials

Realtors

Recreation

Research

Resources

Retail Trade

Service Industries

Shopping Centers

Statistics

Taxation

Technology and Processes

Tourism

Traffic

Transportation

Urban Renewal

Wages

Warehouses

Wholesale Trade

Appendix 4

TRAINING PROGRAM FOR SJU STAFF

Appendix 4

TRAINING PROGRAM FOR SJU STAFF

Schedule

Date/Time	Activity	Staff Responsibility
FIRST WEEK		
Monday, July 1		
9:00 - 11:00	Administrative Time	Collier
1:30 - 4:00	IDD-EES Briefing	Hammond
Tuesday, July 2		
9:00 - 11:30	Discussion of Small-Scale Industry Trends in Developed and Developing Countries	Logan
1:30 - 4:00	Georgia Tech Data and Information Sources	Johnston
Wednesday, July 3		
9:00 - 11:00	Discussion of the Entrepreneur and Appropriate Technologies	Hammond
1:30 - 4:00	Individual Project (Time reserved for individual research, special visits to campus activities, etc., to be scheduled)	
Thursday, July 4	Holiday	
Friday, July 5		
9:00 - 11:30	Generation and Evaluation of Venture Ideas	Collier/ Nelson
PM	Individual Project	
SECOND WEEK		
Monday, July 8		
9:00 - 11:30	Analysis of Project Alternatives: Overview of Process for Analysis and Evaluation of Industrial Projects	Clifton
1:30 - 4:00	Discussion of Market Analysis, Pricing and Costing, and Site Selections	Fyffe
Tuesday, July 9	Field Trip	James

Date/Time	Activity	Staff Responsibility
SECOND WEEK		
Wednesday, July 10	Field Trip	James
Thursday, July 11	Field Trip	James
Friday, July 12	Field Trip	James
THIRD WEEK		
Monday, July 15		
9:00 - 11:30	Resource and Technical Analysis of Project Alternatives	Morelos
PM	Individual Project	
Tuesday, July 16		
9:00 - 11:30	Financial Analysis of Small-Scale Project Proposals	To be designated
PM	Individual Project	
Wednesday, July 17		
9:00 - 11:00	Evaluation of Actual Proposed Projects - FHA	Taylor
PM	Individual Project	
Thursday, July 18		
9:00 - 11:00	Industrial Engineering Application in Small-Scale Industry	James
PM	Individual Project	
Friday, July 19		
9:00 - 11:00	Review of IDD Wood Market Study	Chiang
PM	Individual Project	
FOURTH WEEK		
Monday, July 22	Field Trip	James
Tuesday, July 23	Field Trip	James
Wednesday, July 24	Field Trip	James
Thursday, July 25	Field Trip	James
Friday, July 26	Field Trip	James

Date/Time	Activity	Staff Responsibility
FIFTH WEEK		
Monday, July 29		
9:00 - 11:00	FHA Project Analysis	Taylor
PM	Individual Project	
Tuesday, July 30		
9:00 - 11:00	Management Problems of Small-Scale Industry	Lewis/ Nelson
PM	Individual Project	
Wednesday, July 31		
9:00 - 11:00	Review of IDD Agri-Industry Feasibility Study	Chiang
1:00 - 5:00	Visit to Southern Technical Institute	Logan
Thursday, August 1		
9:00 - 11:30	Curriculum Development: Analysis and Evaluation of Academic Courses	Fyffe
2:00 - 3:00	Involvement of Students in Industrial Development	Nelson
Friday, August 2	Final Discussions	Hammond

B426

SMALL-SCALE INDUSTRY GRANT YEAR II

SOONG JUN UNIVERSITY ACTIVITIES

Grant Period: January 10, 1975 to January 9, 1976

A PROGRAM FUNDED BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

FINAL REPORT
YEAR II

SOONG JUN UNIVERSITY
SMALL-SCALE INDUSTRY GRANT

by

Yoon Bae Ouh

and

Nelson C. Wall

Contract No. AID/ta-c-1062

Economic Development Laboratory
ENGINEERING EXPERIMENT STATION
Georgia Institute of Technology
January 1976

Table of Contents

INTRODUCTION

On January 31, 1975, the Agency for International Development (AID) funded, for the second consecutive year, Contract No. AID/ta-c-1062, through which the Georgia Institute of Technology (GIT) was to make available $45,000 grants for Small-Scale Industry Development Programs to three institutions of higher learning in different geographic regions of the world. Two of the three grants would be for the continuation of existing programs with counterparts selected in 1974; the third grant would be for a new counterpart to be selected in 1975.

Of the two grants for the continuation of existing programs, one went to Soong Jun University (SJU) in Seoul, Korea. This document is the final or end-of-the-year report for the work jointly performed by the staff of SJU in Korea and GIT in Atlanta, Georgia.

When the grant was initiated in 1974, the administration of GIT and the sponsor established the following criteria for the selection of grantee institutions:

1. Suitability of the national macroeconomic framework for local business conditions.
2. Existence of practicing or potential entrepreneurs.
3. Community concern over unemployment.
4. Existence of potential markets for additional products.
5. Linkages (current or potential) with educational, financial, and business communities.
6. Quality of staff.
7. Institution's potential for utilizing grant effectively.
8. Potential multiplier effects.
9. Host government commitments.

After an initial worldwide search, Soong Jun University was one of the two institutions selected and the corresponding grant was established. The final report for the first year of the program was published in 1975 under the following title: Yoon Bae Ouh and Nelson C. Wall, Final Report--Soong Jun University, Small-Scale Industry Grant (January 10, 1974, to January 9, 1975), Industrial Development Division, Georgia Institute of Technology, Atlanta, Georgia, January 1975.

At the end of the second year of this program, the following immediate results are indicative of the work performed:

1. A survey was conducted to determine the initial effects (at the end of 21 months) of this program on 19 small-scale industries that had received technical assistance. A total of 576 jobs had been created (a 66% increase in employment) and reported productivity and profit gains varied from 20% to 200%.

2. On-site technical assistance was provided to 11 different companies in the Seoul area and 17 in the Taejon area for a total of 28 cases during the year.

3. Five programs of quality control were established at the SJU Computer Center and on-site training on quality control methods was provided to interested persons.

4. New interinstitutional agreements were established between SJU and the following two Korean agencies:

> The Industrial Advancement Administration (IAA) of the Ministry of Commerce and Industry
>
> The National Federation of Medium Industries Cooperatives (private organization supported by Korean government)

5. A grant was provided by SJU to the Director of the Integrated Development Center to study the socioeconomic effects of this program in Yong-In, Kyoungy Province.

6. A simple production fixture was designed for a small-scale industry.

7. The EDL staff provided on-site consultation to the SJU staff during the period.

8. The audiovisual documentation for Year II of the program was completed.

9. The College of Engineering has established the Department of Industrial Engineering and is offering the curriculum that was prepared during Year I.

10. Three persons were sent from SJU to EDL headquarters in Atlanta for training.

11. Training programs, lectures, and seminars were presented during the year by the joint SJU and EDL staff.

12. The ITI staff at SJU was increased by three new professional persons in the Departments of Electrical, Chemical, and Industrial Engineering.

PROGRAM PLANS FOR YEAR II

Background

Soong Jun University (SJU) is a prominent Korean institution of higher learning with strong programs in science, engineering, and management-oriented fields. This university was formed in 1970 when Soong Sil College united with Taejon College to form a new cooperative venture in the field of Christian education. Soong Sil College, in turn, was formed in Pyeng Yong (North Korea) in 1897 and reopened in Seoul in 1954, after being closed in 1938 during the Japanese occupation. Taejon Presbyterian College was founded in 1956 by the Southern Presbyterian Mission in the city of Taejon.

Shortly after Dr. Hahn Been Lee became President of Soong Jun University in 1973, he was contacted by Mr. Ross W. Hammond, Director, Economic Development Laboratory (EDL) of the Engineering Experiment Station at the Georgia Institute of Technology. As a result of these contacts, both institutions established an agreement of mutual cooperation on July 30, 1973.

SJU then presented a proposal to the Georgia Institute of Technology for a Program of Development for Small-Scale Industries. It was implemented by a grant funded under an existing contract provided to the Georgia Institute of Technology by the Agency for International Development (AID) for this purpose. In 1974, the EDL, in cooperation with SJU, initiated Year I of a program of small-scale industry development. This program was expanded in 1975 (Year II) under funding by the same sponsor.

The terms of the $45,000 grant permitted the grantee to use half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The remainder of the funds was to be used by the grantee to obtain training and consultation from U.S. technical assistance organizations.

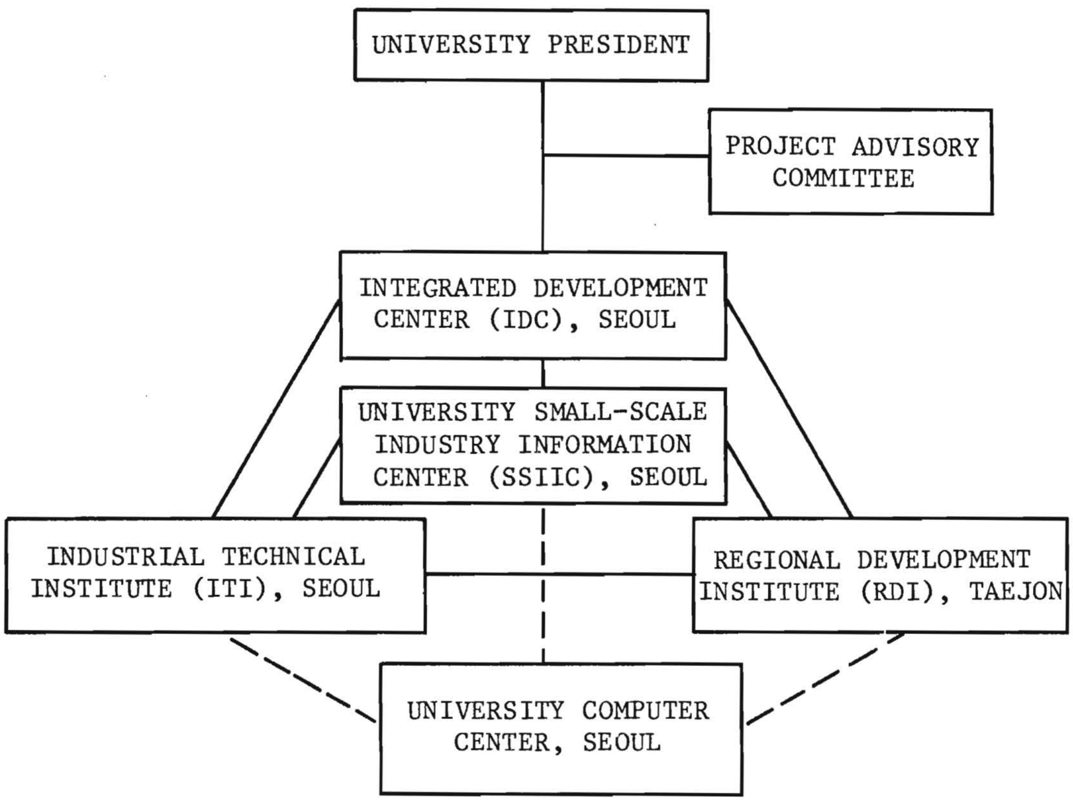
The Georgia Institute of Technology and the Technology and Development Institute, East-West Center, subsequently contracted with the grantee to provide training services and an audiovisual documentation of the project.

The Integrated Development Center (IDC) of Soong Jun University was assigned the responsibility of all program activities for Year II and served as a counterpart to the International Development Branch of EDL.

At the time the Year II program was initiated (on January 10, 1975), the SJU organizational structure was as presented in Figure 1.

Figure 1

ORGANIZATIONAL STRUCTURE OF
SOONG JUN UNIVERSITY
(January 1975)



Dr. Hahn Been Lee, President of Soong Jun University (SJU), named Dr. Yoon Bae Ouh, Head of the Integrated Development Center (IDC), to serve as Counterpart Project Director. Mr. Nelson C. Wall is Project Director for Georgia Tech's portion of the program.

Objective

It is the continuing objective of this project to build a program of industrial extension for small-scale industries at Soong Jun University. Three main areas of activity were considered for Year II: (1) provision of engineering, managerial, scientific, and technical assistance to small-scale industries in defined geographic areas of the Republic of Korea, (2) provision of on-site consultation by staff members of EDL, and (3) strengthening the relevancy of the existing educational program of the university.

At the end of this multi-year project, the sponsor anticipates that SJU will have in operation a well-trained staff that will be fully capable of continuing the provision of technical assistance services to small-scale industries in the area. This service will be provided by the then technically competent members of the SJU indigenous staff trained under this program.

Total Project Goals of the AID/ta-c-1062 Contract

At the start of the Small-Scale Industry Grant on January 23, 1974, the following total goals had been established by the Agency for International Development for the Georgia Tech grant, to be achieved over a period of four years: "The general objective of this contract is to generate employment in developing countries, particularly outside the metropolitan centers, by: (a) strengthening the capability of a selected institution in each country to provide effective technical assistance to local small industry, (b) demonstrating and documenting the impact of alternative approaches to technical assistance to small industry, and (c) infusing the governmental, industrial, and financial sectors of the local community selected to provide employment with an understanding of the techniques of generating jobs. The above objectives will be carried out through the use of grants to selected Lesser Developed Country (LDC) organizations."

Once the total project goals are reached, the sponsor anticipates the following outputs:

1. Increased job opportunities in four countries.
2. Increased viability of indigenously owned enterprises.

3. Improved capability of four LDC institutions to serve small industry.
4. Tested methodologies for strengthening LDC institutions.
5. Evaluation reports on successes and failures in assisting small industry.

All the established goals for Year II were met, plus several additional accomplishments which were listed in the introduction and will be amplified in the balance of this final report.

Program of Work

The Year II proposal presented a program of work on the basis of the work that had been implemented and evaluated during the first 12 months of the project. The following activities were then scheduled for the second 12-month sequence (Year II), all of which have been implemented:

1. Organization. As indicated by Figure 1, several organizations within SJU were concerned with the implementation of this program. These organizations were the Integrated Development Center (IDC), the Industrial Technical Institute (ITI), and the Regional Development Institute (RDI). All programs were to be oriented to serving the small and medium-scale industries in the selected municipalities.

2. Staff and Physical Plant. Once the basic needs of the different units had been identified, appropriate office space, equipment, and manpower were allocated to assure basic logistical support to this project. Three new faculty members joined the Industrial Technical Institute staff--one each from the Departments of Electrical, Chemical, and Industrial Engineering.

3. Project Policy. The program continues to require a multiple input-output system, but it has a basic theme--Stimulation of New and Existing Small and Medium-Scale Industries in Korea.

4. Program Areas. The SJU Project Director and his counterpart at EDL jointly designed a viable program to assure the implementation of the following activities during the second program year:

a. Small-Scale Industry Information Center (SSIIC). This center was established during Year I of the program and had the responsibility of collecting and generating the basic data relevant to the project. The initial collection of information would focus on management and technical data appropriate to small-scale industries.

For Year II, it was planned that increased emphasis would be given to the following areas of work:

(1) Collection, classification, and dissemination of pragmatic, up-to-date information on Korean and international material important to the small-scale industries.

(2) Promotion of wider cooperation and coordination between small-scale industries, the community, and SJU.

(3) Additional on-site consultation and assistance from the IDD senior staff as needed.

(4) Implementation of the guidelines established during Year I for the operation of the SSIIC.

b. Industrial Training and Education. The successful short-term training program for the SJU staff that was carried out during Year I was to be followed by others during the second year. The programs would be offered to small industry managers, engineers, and to entrepreneurs in general.

(1) Presentation of educational programs (short-term) during the year, with consultants assisting in on-site programs. The following areas were considered:

- o Management seminars (e.g., bill collection, taxation, sales, promotion, work improvement, quality control)
- o Training for students who are to be involved in local industry technical assistance services
- o Entrepreneur promotion (e.g., motivation, proposal preparation, accounting, sales)

(2) Continuation of the audiovisual case history started in Year I.

(3) Additional staff training in accordance with needs.

c. University Training and Education. At the end of Year I, Soong Jun University was starting to get some of the feedback resulting from the activities of the year. An Industrial Engineering program was designed and was approved by the Ministry of Education in 1974. SJU made plans to offer the new program in Industrial Engineering by the fall of 1975.

The following additional activities were scheduled for the second year:

(1) Continued preparation of classroom material and course work for the Industrial Engineering Department, to be used by the fall of 1975.

(2) Continued review and reform of the university curriculum.

(3) Identification of specific effects on university educational policies and practices as a result of these industry-oriented programs.

d. Industrial Extension and Research Activities. At the end of the first year, policies and methods had been established which permitted SJU to link up with existing small industries in the target areas and numerous technical assistance activities had been carried out. The plans for Year II considered the following activities:

(1) Pragmatic technical assistance by SJU staff members in the following four major areas:
- o Mechanical Engineering: Four or five companies at Yeong Dung Po Industrial Complex and three to five small companies in Kyung Ki Province were to be selected for concentrated service. Emphasis was to be given to quality control, simple tool design, and general training.
- o Electrical Engineering: Three to five small companies in Kyung Ki Province of the Seoul area would be selected for diagnosis and service. Emphasis was to be given to electrical economy, safety, and general training.
- o Chemical: Three small companies would be selected for concentrated effort in the Taejon area.
- o Textile: Two small companies in the Taejon area would be selected.

(2) Managerial technical assistance would be provided during this year, with emphasis on the following activities:
- o Studies on improving market strategy and financial strategy.
- o Recommendations for better inventory control for effective productivity.
- o Studies on better accounting methods available for small industries.
- o Time and motion studies and methods work.
- o Feasibility studies for establishing new small industries.
- o Cost accounting and other control studies for small industry.

Use of Grant Funds by SJU

For the 1975-76 grant year, the grantee was funded in the amount of $45,000. These funds were disbursed in the following manner:

Expenditures	Sources of Funds: AID	Ind.-Univ.[1] Foundation	SJU[2]	
Direct salaries, wages	$13,500	$5,000	-	$18,500
Travel				
International $4,000	4,000	-	-	4,000
Local $2,750	2,000	750	-	2,750
Materials/supplies	2,000	-	-	2,000
Conferences/seminars	1,000	-	-	1,000
Contracted services (GIT/IDC)				
q SJU personnel training	10,500	-	-	10,500
EDL consulting	10,000	-	-	10,000
TDI (E-W Center)				
Av. case work	2,000	-	-	2,000
SJU indirect expenses				
General overhead	-	-	$8,000	8,000
Technical service support	-	-	3,000	3,000
Totals	$45,000	$5,750	$11,000	$61,750

[1]The Industry-University Cooperation Foundation is a newly established (1974) organization in Korea designed to promote mutual cooperation from which SJU applied for and received a grant.

[2]Normal overhead allowance plus depreciation allowance for use of university labs and workshops.

SOONG JUN UNIVERSITY ACTIVITIES DURING PROGRAM YEAR II

The SJU staff, on both the Seoul and Taejon campus, carried out the major portion of the work programmed for Year II. The following sections highlight some of the activities for the year.

Small-Scale Industry Information Center (SSIIC)

As indicated in the Year I final report, this unit was established in 1974, during which time the EDL on-site staff assisted in establishing guidelines for the classification of the collection and determining the future acquisitional needs. Unfortunately, during Year II, the SSIIC has not met the original expectations. The person on the SJU staff responsible for the SSIIC left SJU and has not been replaced.

It now appears that the SSIIC will be relocated to the Department of Industrial Engineering, where it will become part of the Engineering Library and cease to be a separate unit. During this past year, the Head of the International Development Data Center of the EDL was on-site for a period of two and a half weeks to assist in correcting this unfavorable situation, but he felt severely hampered due to several existing factors and no positive actions were taken to implement his recommendations. It is possible that once the new Engineering Information Center becomes operative, it will take over the original objectives that were established for the SSIIC.

Industrial Training and Education

As part of the program of work in this area, a five-week training program was scheduled, beginning on July 1, 1975, and was presented at the EDL headquarters in Atlanta, Georgia. SJU sponsored three participants in this program--two of them were members of the staff and the third person was an industrialist. The three participants were:

Prof. Won-Hoe Koo, Head Chemistry Department, SJU, Taejon
Prof. Young-Ho Lim, Assistant Head, Mechanical Engineering, SJU, Seoul
Mr. Young-Ho Chae, President of the Sam-Ho Machine Industries Company

The five weeks of training included one week in Atlanta, Georgia, and four weeks of visits to industrial plants and rural small-scale industries in the state of Georgia. Appendix 1 of this report provides a listing of subjects covered during the training, as well as an outline of the week of activity in Atlanta, Georgia. Through this exposure to the EDL's industrial extension service facilities and the methodology presented during the training program, the participants will be able to increase their inputs to the SJU small-scale industry development program.

During this second year, the SJU staff was able to establish five programs for quality control for their IBM 1130 at the Computer Center. The programs were established during the time Dr. Kenneth Stephens of the EDL staff was on-site in Korea. These computerized quality control programs will assist the small-scale industries that need to improve their quality control standards. Also during Dr. Stephen's visit, a series of conferences were held with the SJU engineering faculty on quality control problems and teaching techniques. Several teaching aids were designed and built for future use of the students and staff.

As part of the training and education activities, the SJU staff, together with Dr. Stephens, presented a series of seminars organized by the Korean Chamber of Commerce and Industry on the subject of quality control. These seminars were presented in Seoul, Taejon City, and Inchon City to a total of about 500 persons.

Under the program for Year II, the audiovisual documentation was continued by staff members of the East-West Center, Hawaii, from September 21 to September 27, 1975. The audiovisual for Year II covers some of the technical assistance cases and some selected new cases. These audiovisual materials are available to other interested organizations.

University Training and Education

When this program was initiated in 1974, it was determined that since SJU was a technologically oriented institution, it would be desirable to assist it so that it could expand its engineering programs to include industrial engineering. It was anticipated that through such an extension, future SJU graduates could participate more usefully in the industrial development of the nation.

As a result of this action, by the end of 1974 the appropriate national authorities allowed SJU to establish the Department of Industrial Engineering, as part of the College of Engineering at SJU. The Dean of Engineering, Dr. Clarence E. Prince, has worked closely with the EDL academic staff during Year II to enhance the existing program being offered by the Department of

Industrial Engineering. The latest addition to the SJU academic staff has been Mr. Pyung-Kyu Choi, an industrial engineer.

It has been a secondary objective of this program to identify specific effects on university educational policies and practices generated by or resulting from these industry-oriented programs at the university. In an attempt to define this problem area, Dr. Yoon-Bae Ouh, Director of the Integrated Development Center (IDC), was granted funds by SJU to conduct a survey on the socio-economic effects of this joint program in Yong-In, Kyoungy Province.

Industrial Extension and Research Activities

This continues to be the main portion of the joint program of work. It was planned originally to provide technical assistance to small-scale industries using the industrial extension service approach. This part of the program also covers instances of applied research activities which have been incorporated into the total project. According to the records of the SJU staff, during Year II, 11 different companies were provided technical assistance in the Seoul area and another 17 companies in the Taejon area. The records also indicate that a total of over 139 visits were made to these 28 industries during the year, for an average of about five visits per company receiving technical assistance service. It is further reported that in spite of the continuing economic depression in Korea, many of the companies receiving this service have been able to increase production and employment levels, as well to expand their domestic or export sales. A listing of the companies serviced with particulars on each case is presented as Appendix 2 of this final report.

Employment Generation

Another interesting development in the Year II program conducted by the SJU staff was a survey of 19 companies (12 in Seoul and seven in Taejon) that had received technical assistance during the period from January 1974 to September 1975. The survey's purpose was to determine the employment changes within the selected assisted industries. It shows a gain of 95 new jobs in the Seoul area companies and 481 in the Taejon area companies for a total of 576 jobs, or a 66% increase over the original 868 jobs at the start of the technical assistance service. A summary of the survey results, as reported by SJU, appears as Tables 1 and 2 of this report.

Table 1

SUMMARY OF COMPANIES ASSISTED
BY SOONG JUN UNIVERSITY, SEOUL
1975

Technical Assistance Case No.	Duration of T. A. (Months)		Employment Start	Employment Present	Employment Variance
1	21		38	28	-10
2	21		17	14	-3
3	21		7	8	+1
4	21		15	20	+5
5	21		7	22	+15
6	21		8	18	+10
7	21		14	14	0
8	21		104	142	+38
9	12		37	36	-1
10	21		19	30	+11
11	21		52	52	0
12	18		79	108	+29
		Total	397	492	+95

Source: Soong Jun University, Survey Data, Fourth Quarter, 1975.

Table 2

SUMMARY OF COMPANIES ASSISTED
BY SOONG JUN UNIVERSITY, TAEJON
1975

Technical Assistance Case No.	Duration of T. A. (Months)		Employment		
			Start	Present	Variance
A	6		31	38	+7
B	6		17	16	-1
C	18		22	32	+10
D	21		77	77	0
E	18		269	720	+451
F	21		46	56	+10
G	6		9	13	+4
		Total	471	952	+481

Source: Soong Jun University, Survey Data, Fourth Quarter, 1975

Appropriate Technology

The Year II program emphasized the area of appropriate technology, particularly those technologies relevant to the needs of the Korean communities involved in the project. Although Korea is an industrial society, much of the production continues to be small-scale by international standards. The unique conditions of the Korean culture and the need for intensive labor solutions to the individual problems make it mandatory that appropriate technology choices be made in providing a solution to a given situation.

Since the start of this program, the joint staff has been able to design, build, and field test four devices which are considered by the staff to be appropriate technology for the small-scale industry sector of the host country.

These devices are:

- A low-cost tensile strength tester
- A sizing or shaving die for truing up metal rod cross sections
- A low-cost immersion pyrometer
- A wheeled version of the "chegae," the traditional means of back-pack transport of materials.

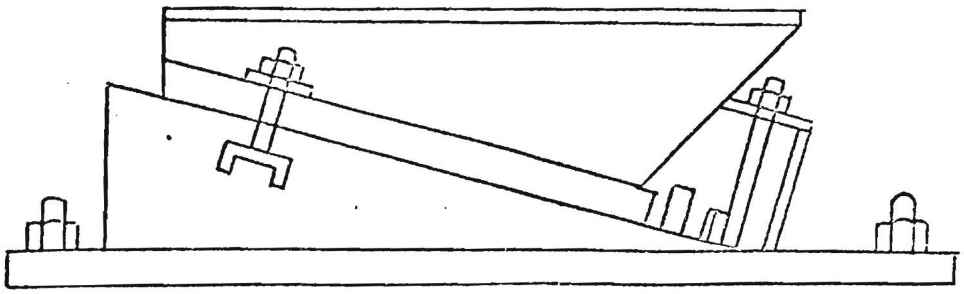
Other Activities

In the engineering process of providing the necessary technical assistance to the industries in the selected areas, the SJU staff was able to identify the need for the development of a jig or fixture which would provide effective and accurate machining at the Sam-Ho Machine Industries Company. After some 20 man-hours of service to the company, actual plans for a set of fixtures were completed. A copy of the original fixture design is presented on the following page as Figure 2. The SJU-designed fixture is now in operation at the Sam-Ho Company and is producing very satisfactory results.

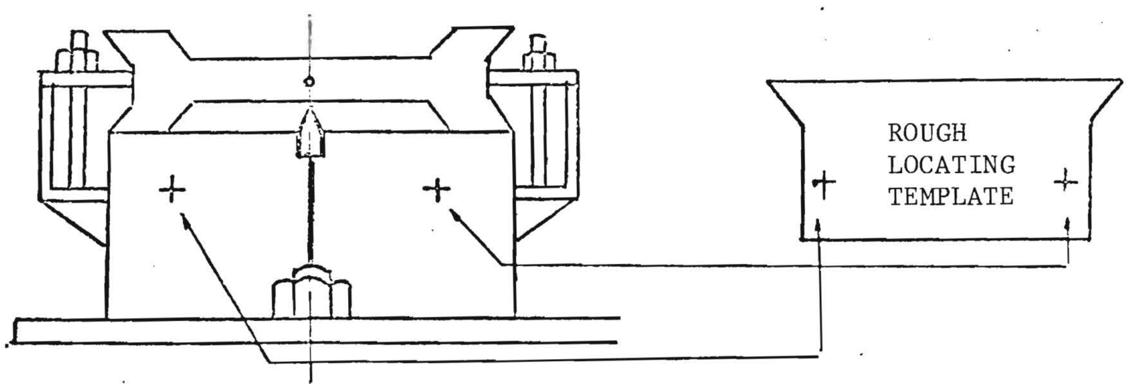
The Industry-University Cooperative Committee implemented a wider program during this year. As a direct result of this broader involvement, the National Committee of the Federation of Small Industries of Korea (NCFSI) asked SJU to participate in its technical service program in recognition of the results generated by the Integrated Development Center of SJU. At present, the SJU staff is providing joint industrial extension services with NCFSI staff to two Korean companies.

Figure 2

FIXTURE DEVELOPED BY SJU STAFF FOR
SAM-HO MACHINE INDUSTRIES COMPANY, KOREA



1. Locate raw casting on slant top fixture. 520 x 280 is first reference surface.
2. Machine 355 x 325 surface.
3. Locate and on boss by using 230 dimension.
Locate center of boss by reference 355 x 325 surface.
Punch center. Outer surface of boss is reference surface; punch mark is other reference point.



4. Locate casting on slant top fixture. Slide punch mark to stop. Use 230 dimension to align. Machine male dovetail surfaces.
5. Locate casting on slant top fixture. Slide mail dovetail into dovetail fixture. Machine female dovetail surfaces.
6. Locate casting on drill fixture using mail dovetail as clamping surface. Drill 20 mm hole.

Another new interinstitutional agreement for the year is one with the Industrial Advancement Administration, which is a very powerful group in the Korean industrial sector.

GEORGIA INSTITUTE OF TECHNOLOGY ACTIVITIES DURING PROGRAM YEAR II

The EDL activities under Year II of the program were initiated by the Project Director on January 10, 1975, when the sponsor advised the Georgia Institute of Technology that the small-scale industry project for Korea would be extended another year. Through the month of January, the Project Director designed the program and consulted with the SJU staff to assure the appropriate emphasis. As per the project plan, Mr. Ben James was to be on-site by early April 1975. He would then be followed by Dr. Kenneth Stephens, Mr. Richard Johnston, and Mr. Larry Edens. Other members of the EDL staff also would interface with the Korean staff, but under a separately funded project.

Each of the EDL staff members was then assigned specific tasks within the total scope of the project. A brief summary of the individual activities follows in chronological order. Figure 3, on the following page, delineates the Project Plan for Year II.

<u>January 26-February 2, 1975 (Dr. Joseph Pettit)</u>

As President of the Georgia Institute of Technology, Dr. Pettit made a project administration visit to Soong Jun University to further improve the professional interaction between these two institutions of higher learning. This activity was funded under a separate grant to the Georgia Institute of Technology sponsored by the Agency for International Development.

<u>January 26-February 2, 1975 (Mr. Ross W. Hammond)</u>

The purpose of Mr. Hammond's trip was to review the status of the project and assist in the planning of the activities for Year II. During his stay, he provided administrative guidance and counseling to the Counterpart Project Director and to his staff. This on-site activity was also funded under Georgia Tech's AID 211(d) grant.

<u>April 3-May 11, 1975 (Mr. Ben James)</u>

It was Mr. James' responsibility to assist the SJU staff in their industrial extension service activities and to serve as a consultant to the small-scale industries, working with SJU in both the Seoul and Taejon areas. Due to his great experience in the area of technical assistance to small-scale industries in Georgia, Mr. James was able to personally assist the SJU staff in

FIGURE 3

PROJECT PLAN

Project No. B-426

Project Title SIG-SJU-YEAR II

Project Director N. C. Wall

Activity	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

Project Initiation January 10, 1975

Project Preparation (SJU & EDL)

Quarterly Reports (SJU & EDL)

Consultant Service - Tech. Assist.

Consultant - Quality Control

SJU Staff Training - Atlanta

Operation of Data Center

Technical Assistance Service

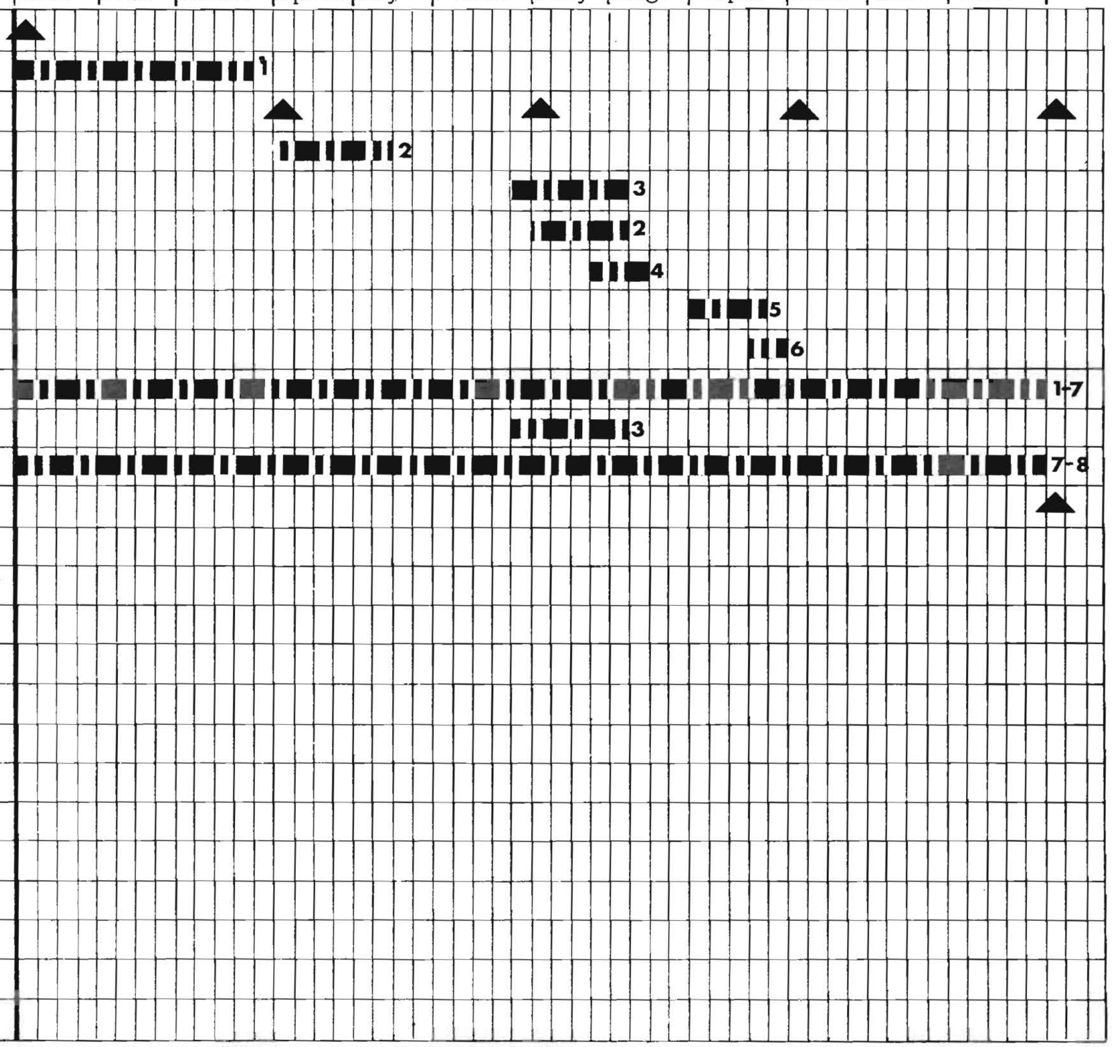
Audiovisual Documentation

Project Direction and Reporting

On-Site Seminars and Workshops

SJU Technical Assistance Service

Final Report



LEGEND Staff

1 N. C. Wall
2 B. James
3 K. Stephens
4 R. Johnston
5 L. Edens
6 Burian-Udunka
7 Y. Ouh
8 SJU Staff

resolving the majority of the cases that are presented in detail in Appendix 2.

April 3-April 12, 1975 (Miss Kay Ellen Auciello)

Sponsored under a separate grant from the Agency for International Development to the Georgia Institute of Technology, this member of the EDL staff provided direct assistance to the Small-Scale Industry Information Center (SSIIC) at SJU. Unfortunately, Mr. Lee, who had been in charge of the SSIIC, had left SJU by the time Miss Auciello arrived. During her stay, she worked with Dr. Ouh, Counterpart Project Director, and a graduate student in reviewing the shortcomings of SSIIC and in formulating recommendations.

June 29-August 2, 1975 (Dr. Kenneth Stephens)

During the Year I program, the EDL staff had repeatedly indicated to the Project Director that one of the main problems facing the small-scale industries being served was quality control. Dr. Stephens, a specialist in that subject, had this on-site assignment under the Year II program. Among other results, Dr. Stephens was able to install five quality control programs using the IBM 1130 computer at the Seoul campus Computer Center. During his stay, he also conducted a number of seminars on appropriate quality control methods for small-scale industries. These seminars were presented in various cities (Seoul, Taejon, and Inchon); they were attended by members of the SJU staff and by the industrial management community.

July 1-August 2, 1975 (Counterpart Training)

Two senior members of the SJU staff and a Korean industrialist participated in a five-week training program at the EDL headquarters in Atlanta, Georgia. The participants were Prof. Won-Hoe Koo, Head of the Chemistry Department at SJU, Taejon campus; Prof. Young-Ho Lim, Assistant Head of the Department of Mechanical Engineering, SJU Seoul campus; and Mr. Young-Ho Chae, President of the Sam-Ho Machine Industries Company. The training program, as designed by Mr. Ben James of EDL, had various forms of training, including classroom activities, on-the-job situations, guidance, consultation, industrial tours, and general contacts within the state of Georgia. A complete list of subjects covered during the training program is presented as Appendix 1.

July 22-August 7, 1975 (Mr. Richard Johnston)

In view of the shortcomings identified in the operation of the SSIIC earlier in the year, it was decided that Mr. Richard Johnston, Head of the International Development Data Center (IDDC) of EDL, should go to Korea and provide additional technical assistance on this subject to the counterpart institution. As a result of his on-site review, Mr. Johnston left with the Counterpart Project Director a set of recommendations which, hopefully, would be implemented at the SSIIC.

September 1-September 20, 1975 (Mr. Larry Edens)

The principal on-site task assigned to Mr. Edens was to continue the program of work initiated by Mr. James in April of this year. Mr. Edens of the EDL staff had the responsibility of continuing the provision of technical assistance, together with SJU staff, to the industries described in Appendix 2.

September 7-October 3, 1975 (Mr. Harvey Diamond)

This member of the EDL staff was sponsored under a separate AID grant and was in Korea to conduct a research project on the export potential of small-scale industries in that country. As a result of his research, a report has been published entitled Export Potential of Selected Korean Small-Scale Industries. All the companies researched for this purpose by Mr. Diamond are being provided technical assistance services under this program.

September 20-September 27, 1975 (Mr. Fred Burian)

Funded under a separate contract, Mr. Burian of the East-West Center, Hawaii, visited SJU. During his stay, he taped audiovisual documentation of the most relevant cases of technical assistance provided to small-scale industries during the year. Full details of these activities are reported in the companion Final Report on Administration Project A-1600 for this year. Assisting Mr. Burian in the audiovisual documentation was Mrs. Edwina Udunka of the EDL staff.

September 20-September 25, 1975 (Dr. Thomas Stelson)

As Vice President for Research of the Georgia Institute of Technology, Dr. Stelson was funded under Georgia Tech's AID 211(d) grant. He conducted a project administration visit to Soong Jun University and interfaced with the academic and project staff at SJU.

September 20-September 27, 1975 (Mr. Ross W. Hammond)

This was considered the last on-site contact for program Year II. Mr. Hammond, Director of the Economic Development Laboratory, together with Dr. Ouh, Counterpart Project Director, prepared the third-quarter report for this program year. During his stay, Mr. Hammond also contacted many of the small-scale industries receiving technical assistance services and provided counseling to Mr. Burian in taping the audiovisual documentation.

RESULTS AND RECOMMENDATIONS

The second year of this small-scale industry development program has had many positive results, a number of which were briefly listed in the introduction section of this final report. In this section, the major accomplishments of Year II will be highlighted:

1. The professional staff at SJU conducted an in-depth survey of 19 small-scale industries that are presently in this program. These companies have been recipients of the technical assistance service for periods no longer than 21 months and not less than six. In summary, the SJU survey reports that 576 new jobs have been created in these 19 industries, 66% increase in employment.

2. The joint SJU/EDL staff was able to provide technical assistance to a total of 28 small-scale industries, of which 11 were in the Seoul area and 17 in the area of Taejon.

3. A specialist from the EDL staff was able to establish five programs of quality control at the SJU Computer Center for future use by the small-scale industries under this program. Furthermore, on-site training in quality control was made available to the SJU staff and other interested persons.

4. Soong Jun University expanded its interinstitutional activities and entered into agreements with both the Industrial Advancement Administration and the National Federation of Medium Industries Cooperatives.

5. The Counterpart Project Director, Dr. Ouh, was awarded a grant by SJU to study the socioeconomic impact of this program at a location within the Kyoungy Province of Korea. The results of this study may provide some very valuable inputs to this program.

6. A simple production fixture was designed and constructed for a participating small-scale industry. Since the start of this program, the joint staff has also developed four devices in the field of appropriate technology, as follows:

- o A low-cost tensile strength tester
- o A shaving or sizing die for truing up metal rod cross sections
- o An inexpensive immersion pyrometer
- o A wheeled version of the "chegae" or Korean backpack

7. On-site consultation was provided by the EDL staff to both the counterpart staff and the participating small-scale industries.

8. A meaningful training program with great pragmatic orientation was specifically designed for and presented to three persons sponsored by SJU. One of the participants was a Korean industrialist and the other two were from the SJU academic staff.

9. The Dean of Engineering has established under the College of Engineering the Department of Industrial Engineering. This is a direct result of the activities initiated during Year I by the joint staff.

10. A continuation of the audiovisual documentation was taped. This Year II documentation covers many of the interesting technical assistance cases which are described in detail in Appendix 2.

11. Several training programs, lectures, and seminars were offered to interested persons during the year by the joint staff.

12. The professional staff of SJU was augmented by three persons--one each in the Departments of Electrical, Chemical, and Industrial Engineering.

One may conclude by saying that during the year, not only have these achievements taken place, but more important, the participating small-scale industries in the selected areas have had a service in the technical assistance field which was previously unattainable.

Appendix 1

SUBJECTS COVERED DURING EDL TRAINING
PROGRAM FOR SJU-SPONSORED PARTICIPANTS

LIST OF SUBJECT TITLES

An Approach to Furnishing Industrial Extension Services to Small-Scale Industry

Outline Guide

The Generation and Evaluation of Venture Ideas

Outline Guide

Selection of Appropriate Technology

Appropriate Technology

Resource and Technical Analysis

Advising the Prospective Entrepreneur on Going Into Business

Outline Guide

A Systematic Approach to Small-Scale Industry Growth

The Presentation of Investment Proposals

Outline Guide

Handout

Evaluating Capital Investment Alternatives

Factors in Plant Layout

Guide to Factors in Plant Layout and Materials Handling

A Simplified Cost and Control System for the Small Industrial Concern

A Simplified Cost and Control System

Inventory Control for Small-Scale Manufacturing

Guide to Inventory Control for Small-Scale Manufacturing

Production Planning and Control for Small-Scale Manufacturing

Production Planning and Control for Very Small-Scale Manufacturing

How to Use a Private Management Consultant

Work Sampling

Quality Control for Small-Scale Manufacturing

Export Opportunities for the Small Manufacturer

FIRST WEEK OF ACTIVITY

Outline

June 30	Indoctrination	Ross Hammond and Staff
July 1	9:00 a.m.	"An Approach to Furnishing Industrial Extension Service to Small-Scale Industry" - William Craig and Richard Johnston
	1:30 p.m.	"Selection of Appropriate Technology" and "Resource and Technical Analysis" - William Studstill
July 2	9:00 a.m.	"Inventory Control for Small-Scale Manufacturing" - Lynn Tessner
	1:30 p.m.	"Production Planning and Control for Small-Scale Manufacturing" and "Work Sampling" - Lynn Tessner
July 3	9:00 a.m.	"Factors in Plant Layout" and "Materials-Handling Equipment Needs" - Philip Hess
	1:30 p.m.	"Quality Control" - William Darley
July 7	9:00 a.m.	"The Presentation of Investment Proposals" - R. L. Hughey
	1:30 p.m.	"Export Opportunities" - Larry Edens
July 8	9:00 a.m.	"The Generation and Evaluation of Venture Ideas" and "Advising the Prospective Entrepreneur on Going Into Business" - Eddie Lewis
	1:30 p.m.	"A Simplified Cost and Control System for the Small Industrial Concern" and "Evaluating Capital Investment Alternatives" - Sherman Dudley

Appendix 2

SUMMARY OF TECHNICAL ASSISTANCE CASES

SUMMARY OF TECHNICAL ASSISTANCE CASES
1975

Seoul Area

Name of Firm	No. of Visits
Sam-Ho Machine Industries Company	15
Sam-Jin Industrial Co.	5
Daewon Cast Iron Co.	55
Dae-Ga Iron Works Mfg. Co.	2
Mi-Kwang Handbag Mfg. Co.	6
Su-Ryung Metal Bolt Mfg. Co.	2
Chin-Hung Casting Co.	3
Bicycle Manufacturing Federation	2
Kwang-Sung	2
Kwang-Shin Machinery Mfg. Co.	2
Sam-Mi Chemicals Mfg. Co.	2

Taejon Area

Sang Yong Soap Mfg. Co.	6
Daedong Industrial Mfg. Co.	6
Dong Young Industrial Mfg. Co.	5
SinSung Paper Mill Co.	5
Nam-II Machinery Mfg. Co.	6
Kong-Shin Paper Mill	1
Taechang Oil Co.	1
Woo Chun Soap Co.	1
Daeyang Soap Co.	1
Taepyong Yang Paper Mill	1
Nam Sung Mach Machinery Co.	1
Ki-Hung Foundry Co.	9
Donjin Tannery	Not Available
Choongnam Soft Food Co.	Not Available
Yougwon Cosmetics	Not Available
Keumnam Industrial Co.	Not Available
Hanjon Agriculture Chemical Co.	Not Available

CASE NO. 1 MAIN PRODUCT: WOODWORKING MACHINES

Municipality: Seoul

Brief Description of Problem

This producer of woodworking machines has been receiving assistance throughout 1975. Three main problem areas were identified: (1) need for the development of jigs and fixtures for machining and assembling the product, (2) lack of an appropriate plant layout, and (3) need to standardize the manufacturing process of the main product line and improve the quality of this product.

Applied Solution

The SJU team, assisted at times by on-site EDL staff, paid 15 visits to the company during the year. A fixture was designed and developed and is now in use. A scale drawing of the plant was completed and changes in layout were recommended. A formal procedure for receiving and inspecting incoming parts was established. Training sessions for foremen and supervisors were held on the subjects of quality control, plant operation, and others. As a result, the quality has increased, and the company is now ready to supply an export order to Australia.

CASE NO. 2 MAIN PRODUCT: SEWING MACHINES

Municipality: Kyounggi-Do

Brief Description of Problem

Two needs were identified by management of the company: (1) develop a system through which castings purchased from a supplier would be inspected and tested for quality and standard variances and (2) improve technology in processing the surface of the sewing machine body.

Applied Solution

During the year, five visits were made by the SJU technical team to this company. An inspection system was designed and installed by which all castings purchased from suppliers are inspected and random samples are tested at the SJU laboratory. A simple technical solution was developed for the second problem, changes were made in cutting procedures which resulted in a better surface finish.

CASE NO. 3 MAIN PRODUCT: MACHINE CASTINGS

Municipality: Kyounggi-Do

Brief Description of Problem

The technical assistance team identified three basic problem areas: (1) poor quality of the castings, (2) need for a production management system, and (3) desire to expand the market, with the possibility of exporting.

Applied Solution

At the end of Year II, the SJU team reported 55 visits to this industry. It was determined that the inferior quality of the castings was due to poor moulding sand and foundry practices. This was corrected through training and technology transfer to the plant staff. An inspection system was established for both the moulding sand and the cast pieces. As a necessary part of the quality control system, the wood patterns were improved. Unfortunately, the economic depression has limited the possibilities of this company.

CASE NO. 4 MAIN PRODUCT: HAMMER MILLS

Municipality: Seoul

Brief Description of Problem

The management of the company wanted to establish manufacturing methods and prepare machine drawings of the parts they were manufacturing. The product range includes a pulverizer, hammer mill, and drier.

Applied Solution

Two visits were made by the SJU staff in providing the requested technical assistance. The staff has made a set of prototypes of the products, all of which are being tested at the SJU laboratory. Drawings of the parts were also made. Additional theoretical analysis of some of the production items is now under way.

CASE NO. 5 MAIN PRODUCT: HANDBAGS

Municipality: Boochun

Brief Description of Problem

The main problems presented were: (1) no knowledge of the chemical content of the water used in the plating solution, (2) desire to control the thickness of the metal plating, (3) need to accelerate dehydration after plating, and (4) desire to determine true manufacturing costs.

Applied Solution

SJU, assisted by EDL staff members, made a total of six visits to this plant. A sample of the water was taken and a chemical analysis was done at SJU; results were made known to the company with appropriate recommendations. Tests were performed to determine the thickness of the metal plating (both copper and nickel), and again recommendations were made. The dehydration process was reviewed and recommendations made. A simple quality control system also was suggested.

CASE NO. 6 MAIN PRODUCT: METAL FASTENERS

Municipality: Young Dong Po

Brief Description of Problem

The company wishes to enter the export market with its product line of bolts and machine screws. The firm now sells to Mattel Company through an intermediary trading company.

Applied Solution

The joint technical assistance staff paid two visits to this company. While Mr. Diamond (EDL) was in Korea, he examined the export potential of the company product. Recommendations have been made.

CASE NO. 7 MAIN PRODUCT: METAL CASTINGS

Municipality: Kyonggi-Do

Brief Description of Problem

The company requested marketing information and evaluation of the export potential of their "sporting-goods" line of metal castings.

Applied Solution

The SJU team made three visits to the company to research the problem. After discussing the possibilities of exporting these products, it was decided that additional research was needed on the export potential.

The team also recommended that the company start manufacturing cooking utensils, household appliances, and other items.

CASE NO. 8 MAIN PRODUCT: BICYCLES

Municipality: Jongro-Gu

Brief Description of Problem

These manufacturers of bicycles wish to export bicycle parts or bicycles that are produced by a "federation" of manufacturers.

Applied Solution

A joint SJU/EDL team acted on this case and the "federation" was visited twice by the team of experts. The performance and quality of the product are questionable, but no detailed performance tests were made. The problem of exporting parts is being reviewed by Mr. Diamond of EDL, and his report is pending.

CASE NO. 9 MAIN PRODUCT: MICROPHONES OF HEAD-PHONES

Municipality: Seoul

Brief Description of Problem

The manufacturer is faced with a technical problem related to the "corona-arc" treatment during the manufacturing process. Another problem area is the lack of a standard manufacturing process.

Applied Solution

Two visits were made by the SJU team, assisted by an electronics engineer. The technical problem was beyond the capability of the team and remains unsolved.

The second problem was then reviewed and recommendations were made to improve the manufacturing process.

CASE NO. 10 MAIN PRODUCT: ROLLER BEARINGS

Municipality: Seoul

Brief Description of Problem

This manufacturer of roller bearings had a problem with his carbon hardening process. Once this was improved, he wished to develop jigs and fixtures in order to mass-produce his product.

Applied Solution

After three visits by the SJU technical assistance team, the carbon-hardening problem was resolved by introducing some changes to the carbonization furnace. Jigs and fixtures were designed and are now in use by the manufacturer. Testing of the product also has been introduced and is now being performed.

CASE NO. 11 MAIN PRODUCT: REFINED SALT

Municipality: Seoul

Brief Description of Problem

For some time, the manufacturer has been having problems with his process. Two main problems are: (1) clogging of the conveyor pipe, and (2) low efficiency in the water filtering system.

Applied Solution

Two visits have been made by the technical staff of SJU, but due to the fact that the plant has been closed for a year, they have been unable to determine the magnitude of the first problem.

The problem of the filtering system also has been deferred to a later date when a complete study can be made.

CASE NO. 12 MAIN PRODUCT: SOAP

Municipality: Taejon

Brief Description of Problem

This manufacturer produces inexpensive soap for general use and had been having some problems with his material handling.

Applied Solution

Since this company requested technical assistance, six visits have been made by the SJU team, assisted by on-site EDL personnel. A recommendation was made to replace the conveyor system that feeds the raw material to the production line. This has been implemented and the employment level of the plant has been increased.

CASE NO. 13 MAIN PRODUCT: MATCHES

Municipality: Taejon

Brief Description of Problem

Two areas were identified as problems: (1) cost of production, and (2) productivity.

Applied Solution

The company started receiving technical assistance in mid-March of 1975 and was visited six times by the SJU team. Following their recommendations, management purchased additional manufacturing equipment. Production has increased, and profits also have been higher for the company.

CASE NO. 14 MAIN PRODUCT: BICYCLE PARTS

Municipality: Taejon

Brief Description of Problem

A manufacturer of hand brakes and handles for bicycles had trouble with his handles, which were failing under impact testing.

Applied Solution

The technical team from SJU, assisted by an EDL staff member, made five visits to this plant. Samples of the materials used in the manufacturing process were analyzed at the SJU laboratory, and the results of the tests were made available to the manufacturer. The team made appropriate recommendations to the company management, and these were implemented. The defect rate has been reduced by 5% as a result of the assistance provided.

CASE NO. 15 MAIN PRODUCT: KRAFT PAPER

Municipality: Taejon

Brief Description of Problem

This company requested management technical assistance. This case was reported in 1974.

Applied Solution

Since April 1974, this company has been receiving assistance from the SJU team, with five visits being reported in 1975.

The company continues to maintain profits at the same level as last year in spite of the economic depression and fierce competition.

CASE NO. 16 MAIN PRODUCT: MILLING AND DRILLING MACHINES

Municipality: Taejon

Brief Description of Problem

Two problem areas were identified by the team of experts: (1) need for standard manufacturing charts and (2) difficulties with the manufacturing process in the areas of tolerance, cutting speeds, depth of cuts, and other items.

Applied Solution

Six visits were paid to this company by the SJU team and on-site EDL staff personnel. Detailed instructions were given to the machine operators as to machine capability, use and abuse. Charts were prepared for several production items. Technical transfers were made in the areas of manufacturing process controls.

CASE NO. 17 MAIN PRODUCT: KRAFT PAPER

Municipality: Taejon

Brief Description of Problem

Management was having problems in the production cost area.

Applied Solution

After only one visit, the SJU team recommended a change in the caustic soda solution which provides management with a 3.75% savings in the cost of caustic soda. Also, the team recommended a simple process by which the company could make its own boiler compound.

CASE NO. 18 MAIN PRODUCT: RICE BRAN OIL

Municipality: Taejon

Brief Description of Problem

Two problems were identified: (1) shortage of raw material (rice bran) and (2) color of final product.

Applied Solution

As a result of one visit by the SJU team, it was recommended to the industrialist that he use other vegetable seeds as raw material. The product could be clarified by using active clay, and this was also recommended. It was further suggested that he prepare animal feed from the oil residues and sell this product.

CASE NO. 19 MAIN PRODUCT: SOAP

Municipality: Taejon

Brief Description of Problem

Desire to clarify final product and establish a system to inspect raw material.

Applied Solution

As a result of one visit by the SJU team, the following recommendations were made: (1) a simple clarification method for the soap, which is made of rice bran oil residues; (2) an inspection system which will control all raw materials entering the plant.

CASE NO. 20 MAIN PRODUCT: SOAP

Municipality: Taejon

Brief Description of Problem

This small manufacturer had a problem similar to the one reported in the previous case. He needed assistance in clarifying the soap being produced.

Applied Solution

The SJU team made a visit to the plant and recommended a simple bleaching process to remove the color from the soap. While there, they also suggested a technique to remove the glycerol after sterilization.

CASE NO. 21 MAIN PRODUCT: TOILET TISSUE

Municipality: Taejon

Brief Description of Problem

The plant, with 31 employees, was having difficulty in producing the desired quality of toilet tissue.

Applied Solution

The SJU team visited the plant and made recommendations to improve the method of breaking down the waste paper being used through the action of caustic soda and calcium hydroxide. This allows for the production of a higher-quality final product. The team also showed the plant owner how to make his own boiler compound out of soda ash, sodium phosphate, tannic acid, and sodium hexameta phosphate.

CASE NO. 22 MAIN PRODUCT: MATCHES

Municipality: Taejon

Brief Description of Problem

Company had a problem with the absorption of moisture by the finished product.

Applied Solution

This is a company with 300 employees. The SJU team made one visit and was able to suggest to the plant owner a method of preventing the matches from becoming moist. Analytical data on the chemicals in use also were provided.

CASE NO. 23 MAIN PRODUCT: MILLING MACHINES

Municipality: Taejon

Brief Description of Problem

The problems identified were the following: (1) manufacturing problem, (2) process control, (3) operation control, and (4) quality control. In all areas, a lack of training also was noted.

Applied Solution

After nine visits by a joint SJU and NCFSI team, the following recommendations were made:

1. Instructions were given as to techniques and procedures of production scheduling, lot sizes, work load balancing, and other matters.

2. Process time was reduced and standard operations were established for main products.

3. A manual is being prepared for standard methods to be used in the future.

4. Instructions were given on quality control and inspection standards.

5. A training program was presented to 25 employees.

CASE NO. 24 MAIN PRODUCT: LEATHER GOODS

Municipality: Taejon

Brief Description of Problem

Continuation. Case presented in 1974.

Applied Solution

Since the recommendations were implemented by management, the plant is operating in a more efficient fashion and the employment has increased 22%, according to recent reports.

CASE NO. 25 MAIN PRODUCT: SOYBEAN CURD AND OIL

Municipality: Taejon

Brief Description of Problem

The traditional method of making soybean curd requires 100% soybean oil. Management wished to know if curd made with defatted soybean oil would be of the same quality as traditional curd.

Applied Solution

The SJU team made a laboratory analysis and determined that soybean curd made from 50% soybean oil and 50% defatted soybean oil was almost identical to the standard product. While doing this, the team also suggested a better method for refining the soybean oil to the plant owner.

CASE NO. 26 MAIN PRODUCT: COSMETICS

Municipality: Taejon

Brief Description of Problem

Company had been closed because it did not meet Ministry of Health standards and regulations.

Applied Solution

The SJU team provided the company with a list of laboratory equipment that is required, as well as testing procedures. Until the company can purchase its own equipment, laboratory testing will be done by the SJU staff at the university laboratories. Company is back in operation.

CASE NO. 27 MAIN PRODUCT: LEATHER JACKETS

Municipality: Taejon

Brief Description of Problem

Two problem areas were in evidence: (1) packaging the finished product and (2) ironing the garments.

Applied Solution

The SJU team suggested the use of silica gel in the packing of the leather jackets to prevent spoilage by moisture. A new ironing system also was recommended.

CASE NO. 28 MAIN PRODUCT: INSECTICIDE

Municipality: Taejon

Brief Description of Problem

Plant manager wished to improve quality control.

Applied Solution

The SJU team took back to the SJU laboratory samples of the product and checked their composition. The team then instructed the staff at the plant on how to test and analyze their product, using the equipment they had available in the plant.

B-426

SMALL–SCALE INDUSTRY GRANT YEAR IV

SOONG JUN UNIVERSITY ACTIVITIES

Grant Period: January 10, 1977 to January 9, 1978

A PROGRAM FUNDED BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

FINAL REPORT
YEAR IV

SOONG JUN UNIVERSITY
SMALL-SCALE INDUSTRY GRANT

by

Yoon Bae Ouh,

Richard Johnston

and

Donald E. Lodge

Contract No. AID/ta-c-1062

Office of International Programs
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia 30332, U. S. A.

January 1978

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Tables (Continued)

INTRODUCTION

On January 1977, the Agency for International Development (AID) funded, for the fourth consecutive year, Contract No. AID/ta-c-1062, through which the Georgia Institute of Technology (GIT) was to make available $45,000 grants for small-scale industry development programs to four institutions of higher learning in different geographic regions of the world. Three of the four grants were for the continuation of existing programs with counterparts selected in 1974 and 1975; the fourth grant was for a new counterpart selected in 1977.

Of the three grants for the continuation of existing programs, one went to Soong Jun University (SJU) in Seoul, Korea. This document is the final or end-of-the-year report for the work jointly performed by the staff of SJU in Korea and GIT in Atlanta, Georgia.

When the grant was initiated in 1974, the administration of GIT and the sponsor established the following criteria for the selection of grantee institutions:

1. Suitability of the national macroeconomic framework for local business conditions.
2. Existence of practicing or potential entrepreneurs.
3. Community concern over unemployment.
4. Existence of potential markets for additional products.
5. Linkages (current or potential) with educational, financial, and business communities.
6. Quality of the staff.
7. The institution's potential for utilizing the grant effectively.
8. Potential multiplier effects.
9. Host government commitments.

After an initial worldwide search, Soong Jun University was one of the first two institutions selected and the corresponding grant was established. Final (annual) reports were published in 1975, 1976, and 1977. Details of the first three years' activities may be found in those documents.

At the end of Year IV of the program, the following immediate results are indicative of the work performed:

1. A survey of 17 firms receiving technical assistance from SJU during 1977 shows an increase of 120 jobs or a 14.8% increase over the 12-month period.

2. Twenty-eight companies were provided with technical assistance during the year -- 13 in Seoul and 15 in the Taejon area.

3. A firm in Taejon received a $125,000 loan from the Asian Development Bank for a new plant.

4. Audiovisual documentation of this Small Industry Grant program was continued with coverage of both new and old cases.

5. The prototype "cheegay" received final field testing and a manufacturer has agreed to produce 500 units on speculation for test marketing during 1978.

6. SJU established working relationships with Korean national institutions.

7. SJU faculty received national and international recognition for their work with small-scale industry in Korea.

8. SJU's Integrated Development Center (IDC) and Regional Development Institute (RDI) conducted seminars and training courses for small business managers, students, and government employees.

9. RDI published three publications and IDC published one.

PROGRAM PLANS FOR YEAR IV

Background

Soong Jun University (SJU) is a prominent Korean institution of higher learning with strong programs in science, engineering, and management-oriented fields. This university was formed in 1970 when Soong Sil College united with Taejon College to form a new cooperative venture in the field of Christian education. Soong Sil College, in turn, was formed in Pyeng Yong (North Korea) in 1897 and reopened in Seoul in 1954, after being closed in 1938 during the Japanese occupation. Taejon Presbyterian College was founded in 1956 by the Southern Presbyterian Mission in the city of Taejon.

Shortly after Dr. Hahn Been Lee became President of Soong Jun University in 1973, he was contacted by Mr. Ross W. Hammond, Director, Economic Development Laboratory (EDL) of the Engineering Experiment Station at the Georgia Institute of Technology. As a result of these contacts, both institutions established an agreement of mutual cooperation on July 30, 1973.

SJU then presented a proposal to the Georgia Institute of Technology for a program of development for small-scale industries. It was implemented by a grant funded under an existing contract provided to the Georgia Institute of Technology by the Agency for International Development (AID) for this purpose. In 1974, the EDL, in cooperation with SJU, initiated Year I of a program of small-scale industry development. This program was expanded in 1975 (Year II) and continued in 1976 (Year III) under funding by the same sponsor.

The terms of the $45,000 grant permitted the grantee to use half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The remainder of the funds was to be used by the grantee to obtain training and consultation from U. S. technical assistance organizations.

The Georgia Institute of Technology and the Technology and Development Institute, East-West Center, subsequently contracted with the grantee to provide training services and an audiovisual documentation of the project.

The Integrated Development Center (IDC) of Soong Jun University was assigned the responsibility for all program activities for Year III and served as a counterpart to the International Development Branch of EDL (now the Office of International Programs - OIP).

Objective

It is the continuing objective of this project to build a program of industrial extension for small-scale industries at Soong Jun University. Three main areas of activity were considered for Year IV: (1) provision of technical and managerial assistance to small-scale industries in defined geographic areas of the Republic of Korea, (2) development of simple solar energy devices, (3) strengthening the relevancy of the existing educational program of the university, and (4) provision of training activities for small-scale industry.

At the end of this multi-year project, the sponsor anticipates that SJU will have in operation a well-trained staff that will be fully capable of continuing the provision of technical assistance services to small-scale industries in the area. This service will be provided by the then technically competent members of the SJU indigenous staff trained under this program.

Total Project Goals of the AID/ta-c-1062 Contract

At the start of the Small-Scale Industry Grant on January 23, 1974, the following total goals had been established by the Agency for International Development for the Georgia Tech grant, to be achieved over a period of four years:

> The general objective of this contract is to generate employment in developing countries, particularly outside the metropolitan centers, by: (a) strengthening the capability of a selected institution in each country to provide effective technical assistance to local small industry, (b) demonstrating and documenting the impact of alternative approaches to technical assistance to small industry, and (c) infusing the governmental, industrial, and financial sectors of the local community selected to provide employment with an understanding of the techniques of generating jobs. The above objectives will be carried out through the use of grants to selected Lesser Developed Country (LDC) organizations.

Once the total project goals are reached, the sponsor anticipates the following outputs:

1. Increased job opportunities in four countries.
2. Increased viability of indigenously owned enterprises.
3. Improved capability of four LDC institutions to serve small industry.
4. Tested methodologies for strengthening LDC institutions.
5. Evaluation reports on successes and failures in assisting small industry.

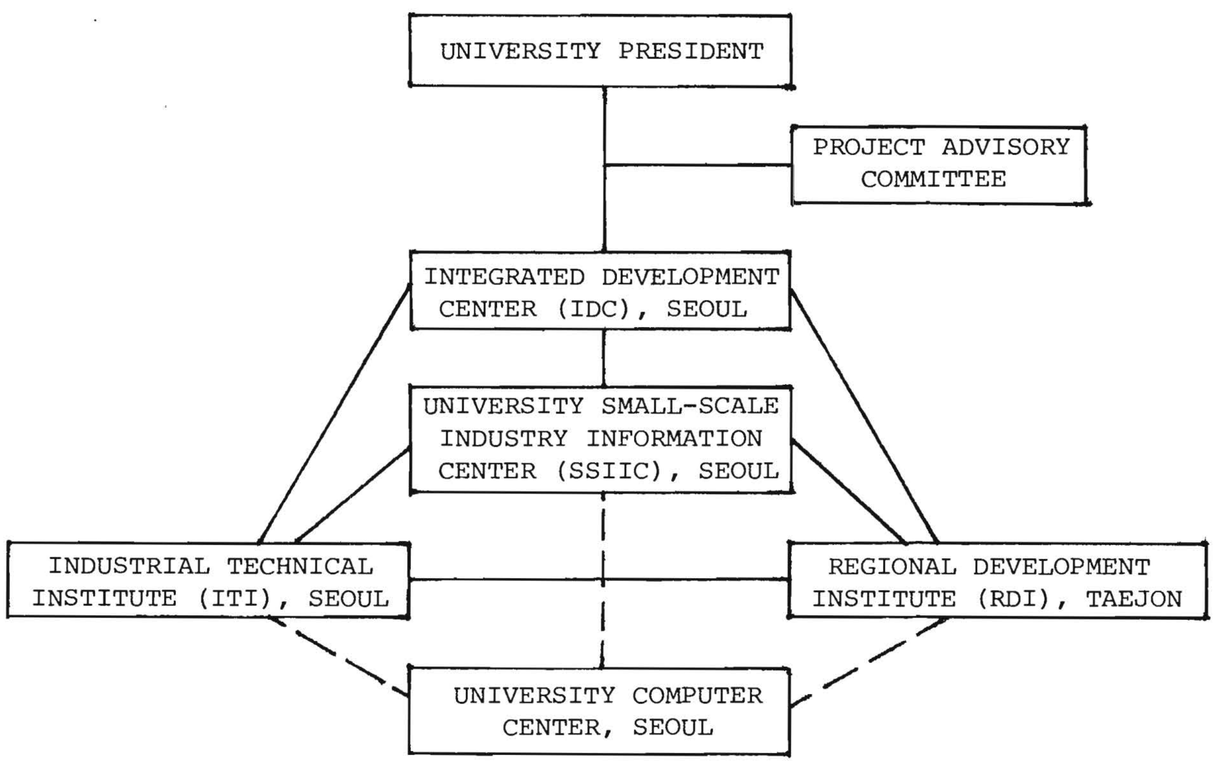
Most of the established goals for Year IV were met, plus several additional accomplishments which were listed in the Introduction and will be amplified in the balance of this annual report.

At the time the Year IV program was initiated (on January 10, 1977), the SJU organizational structure was as presented in Figure 1.

Upon his selection as president of the university, at the time Dr. Hahn Been Lee's term expired, Dr. Bum Soe Koh designated Dr. Yoon Bae Ouh, Head of the Integrated Development Center (IDC), to continue to serve as Counterpart Project Director. Mr. Nelson C. Wall is Project Director and Mr. Richard Johnston is Project Coordinator for Georgia Tech's portion of the program.

Figure 1

ORGANIZATIONAL STRUCTURE OF SOONG JUN UNIVERSITY
(January 1977)



Program of Work

The Year IV proposal presented a program of work on the basis of the work that had been implemented and evaluated during the third 12 months of the project. The following activities were then scheduled for the fourth 12-month sequence (Year IV), most of which have been implemented:

1. Technical/Managerial Assistance

a. Emphasis will continue to be placed on the mechanical engineering area, but expansion into other technical areas will proceed as begun in 1975 and carried forward in 1976. During the latter year, assistance was provided in textile engineering, electrical engineering, chemical engineering, electronic engineering, and commercial design in both the Seoul and Taejon areas.

b. Managerial and industrial engineering assistance will continue to be expanded, with emphasis on quality control and general industrial management techniques.

c. During 1977, emphasis will continue to be placed on more *efficient energy management* in small-scale Korean industries. This is extremely important because of the very high costs of energy in Korea, which imports all its oil and has relatively little water power or other major domestic energy sources.

2. Solar Energy and Small-Scale Industries. With continuing technical assistance from the Georgia Institute of Technology, SJU's engineering staff will seek to develop simple and inexpensive devices to utilize solar energy. These may be usable in small-scale industries or be suitable for production and sale by small firms. Work also will be conducted on the redesign of the traditional Korean greenhouse to provide a more efficient design for the use of small farmers, using the above-mentioned solar devices.

During 1976 an experimental solar collector was built and put into observation on the Seoul campus. Research aimed at a more efficient and less expensive design will continue during 1977, with actual production and marketing anticipated for 1978. Prototypes now being marketed in other nations will be collected for study and adaptation to the Korean situation.

SJU will continue to work with Georgia Tech and the Korea Institute of Science and Technology in matters related to practical, marketable solar devices for production and use in Korea.

3. Appropriate Technology. The SJU staff already has been engaged in some development of appropriate technology, such as the "cheegay," the tensile strength tester, the shaving die, and the immersion pyrometer. Much work was done during 1976 on the design and production of prototypes of a wheeled "cheegay." During 1977, this item will be redesigned to reduce the weight and the cost, and then manufacturers will be sought for the final design. The SJU staff will continue to seek out needed low-cost items and design these for small-scale industry and the small farmer.

4. Organizational Linkages and Information Exchange. The joint SJU/GIT program, from its inception, has sought to facilitate linkages between various industry and governmental agencies interested in small and medium-scale industries. During 1977, an information exchange between SJU and various agencies will be continued. Information useful to small-scale industry will be made available via SJU's Small-Scale Industry Information Center. SJU will make continuous efforts in 1977 to collect and disseminate more managerial and technical information to small-scale industries, with special reference to items 1, 2, and 3, above. While through 1976 the collection has concentrated on printed materials, starting in 1977 audiovisual materials will receive greatest priority.

5. Training Programs. During 1976, SJU began offering seminars for industrial managers. A short-term course was given to owners, managers, and engineers from firms belonging to the Korea Communication Instrument Industry Association, with some 50 in attendance. Industry and government interest continues to be strong for training in such areas as quality control, energy management, and programs for owners, managers, engineers, and unskilled workers. Training courses will run from two to three weeks and will be held either on the SJU campus or in the plant.

The basic texts, instructional materials, etc., will be developed by the SJU/GIT team. Areas to be covered will include technical topics such as quality control and the effective utilization of existing plant and equipment, but also such general management topics as cost analysis, production control, and entrepreneurial development. Joint SJU/GIT training activities are of high priority in the 1977 program.

6. Educational Activities. 1976 was the second year of operation for SJU's new Industrial Engineering Department. This department was established in connection with the joint SJU/GIT project.

During 1977, it is planned that the following activities will be carried out:

a. various training seminars for the faculty and students
b. assessment of the joint SJU/GIT program
c. development of written and audiovisual case histories
d. U. S. training for faculty members

Use of Grant Funds by SJU

For the 1977-1978 grant year, the grantee was funded by AID in the amount of $45,000. These and other funds were disbursed by SJU as shown in Table 1.

Table 1

DISBURSEMENT OF GRANT AND OTHER PROJECT FUNDS
SJU - YEAR IV
(in U. S. dollars)

Expenditures	Funds by Source: AID 1/	Funds by Source: Ind.-Univ. Foundation 2/	Funds by Source: SJU 3/	Total
Direct Salaries and Wages	$ 9,720	$8,500	-	$18,220
Travel				
International	3,940	-	-	3,940
Local	-	1,000	-	1,000
Materials/Supplies	6,660	-	-	6,660
Conferences/Seminars	2,180	-	-	2,180
Contracted Services (GIT)				
OIP Consulting	20,500	-	-	20,500
Audiovisual Documentation	2,000	-	-	2,000
SJU Indirect Expenses				
General Overhead	-	-	$ 8,000	8,000
Technical Service Support	-	-	3,000	3,000
Totals	$45,000	$9,500	$11,000	$65,500

1/ From AID Small-Scale Industry Grant.

2/ The Industry-University Foundation is an organization in Korea designed to promote mutual cooperation, to which SJU applied for and received a grant.

3/ Normal overhead allowance plus depreciation allowance for use of university labs and workshops.

SOONG JUN UNIVERSITY ACTIVITIES DURING PROGRAM YEAR IV

The SJU staff, on both the Seoul and Taejon campuses, carried out the major portion of the work programmed for Year IV. The following sections highlight some of the activities.

Technical/Managerial Assistance

This continues to be the main portion of the joint program. It was originally planned to provide technical assistance to small-scale industries using the industrial extension service approach. According to the records of the SJU staff, during Year IV, 13 companies were provided with assistance by the Seoul campus staff and another 15 companies by the Taejon campus staff. A listing of the companies served, with particulars on each, is presented as Appendix 1 of this report.

A significant result of the technical and managerial assistance work carried out by the SJU/GIT team during Year II (1975) was the granting in early 1977 of a loan for US$125,000 by the Asian Development Bank to a manufacturing firm located in Taejon. The director of RDI, the president of SJU, and Dr. David Fyffe of GIT had written letters of recommendation to the Asian Development Bank in support of this loan application. The new plant is now under construction and will be in operation in early 1978. The new facility will permit plant employment to increase substantially.

Employment Generation

Another interesting development in the Year IV program conducted by the SJU staff was a survey of 17 companies (seven served by the Seoul campus staff and 10 served by the Taejon campus staff) that had received technical assistance at some time during the period from 1974 to 1977. (See Tables 2, 3, and 4.) The survey's purpose was to determine the employment changes within the selected assisted industries. For the two campuses (Table 4) the survey indicated a gain of 159 jobs during 1976 and 120 during 1977, for a total gain of 279 jobs between the end of 1975 and the end of 1977. These constitute increases of 24.4%, 14.8%, and 42.9%, respectively.

Solar Energy and Small-Scale Industries

Several items of solar energy hardware had been developed or were under development at the year's end. These included continuing work in Seoul on the

Table 2

SUMMARY OF EMPLOYMENT CHANGES OF SURVEYED COMPANIES
ASSISTED BY SOONG JUN UNIVERSITY, SEOUL, 1977

Technical Assistance Case No.	Employment				Change		
	Beginning of 1974	End of 1975	End of 1976	End of 1977	1976-77	1974-77	To Date
B	*	14	21	26	5	-	12
D	14	14	29	37	8	23	23
E	104	142	155	195	40	91	91
F	37	36	40	76	36	39	39
G	19	30	43	53	10	34	34
H	52	52	74	90	16	38	38
J	*	39	98	105	7	-	66
Total	226	327	460	582	122	225	303

* Case begun following year.

Source: Soong Jun University, Survey Data, 1977.

Table 3

SUMMARY OF EMPLOYMENT CHANGES OF SURVEYED COMPANIES
ASSISTED BY SOONG JUN UNIVERSITY, TAEJON, 1977

Technical Assistance Case No.	Employment			Change		
	End of 1975	End of 1976	End of 1977	1975-76	1976-77	To Date
A	38	14	*	-24	-14	-38
C	32	23	23	- 9	0	- 9
D	77	95	98	18	3	21
F	56	60	61	4	1	5
H	25	26	32	1	6	7
I	13	18	14	5	- 4	1
J	3	5	6	2	1	3
K	5	12	12	7	0	7
L	45	66	66	21	0	21
M	30	31	36	1	5	6
Total	324	350	348	26	- 2	24

* Closed.

Source: Soong Jun University, Survey Data, 1977.

Table 4

SUMMARY OF EMPLOYMENT CHANGES OF SURVEYED COMPANIES
ASSISTED BY SOONG JUN UNIVERSITY, BOTH CAMPUSES, 1975-1977

	Employment			Change		
	End of 1975	End of 1976	End of 1977	1975-76	1976-77	1975-77
Seoul	327	460	582	133	122	255
Taejon	324	350	348	26	- 2	24
Total	651	810	930	159	120	279

Source: Soong Jun University, Survey Data, 1977.

solar flat plate collector project begun in 1976. A second generation collector is being designed, utilizing lighter weight, less costly indigenous materials, and providing a higher rate of efficiency. The goal of this project is a collector design which can be produced in commercial quantities by small-scale industry at a price affordable by Korean consumers.

During 1977, an experimental solar water heater was built at Ma Dong Village in Wae-San Myon by Professor Charles Krauth of the Taejon campus. He also constructed an improved hothouse for use by small farmers. This unit is made of clear polyethylene sheeting, plastic pipe, and styrofoam insulation sheeting. Rocks are used as a heat storage medium, and styrofoam is placed on the northern wall to act as a reflector and insulator, keeping the north winds out and reflecting the sun's beams down onto the rock. This hothouse is located near Ma Dong Village, close to a favorite resting place of the farmers as they come through the area collecting firewood, giving maximum exposure to the hothouse by the farmers.

The Seoul campus staff also erected and tested a windpower-driven water pump during 1977.

Appropriate Technology

Activities by the Taejon campus staff in the field of appropriate technology continued to concentrate on the development of an improved "cheegay." During 1977, two new models were designed, based on previous testing; prototypes were fabricated; and both models were tested in the field through actual use in rural and urban situations. The latest model was then selected for full-scale production and test marketing. A manufacturer has agreed to produce 500 units on speculation and test market them during 1978. The Taejon campus staff will provide technical assistance and monitor the sales and user reactions during 1978.

Professor Charles Krauth of the Taejon campus staff has developed a semi-portable methane gas generator utilizing animal dung.

Organizational Linkages and Information Exchange

As a result of the AID-sponsored Small Industry Grant, over the past four years, SJU has been able to lay the necessary groundwork in order to gain recognition as a leading Korean educational institution in the field of stimulating and fostering small-scale industry. This is reflected in the following:

1. During 1977, SJU established linkages with the Korea Credit Guarantee Fund (KCGF), the Korea Federation of Small Business (KFSB), the Korea Ministry of Commerce and Industry (KMCI), and the Korea Medium Industry Bank (KMIB).

2. SJU provided the following services to these agencies or organizations:

   a. Acted as management consultants regarding their small industry programs.

   b. Provided information on a variety of managerial and technical subjects.

   c. Provided management and technical assistance to small industrial firms, at the request of the above-mentioned agencies or organizations.

   d. Dr. Ouh served as Secretary-General of the Korea Committee, Korea Federation of Small Business' Fourth International Symposium on Small Business, which was held in Seoul on October 10-14, 1977. Some 300 persons representing over 45 nations were in attendance.

   e. Dr. Ouh now is serving as a member of the Small Industry Development Policy Committee of the Korea Ministry of Commerce and Industry.

   f. At the invitation of the Korea Federation of Small Business, Dr. Ouh delivered a keynote address on "Small Industrial Development Problems in Developing Countries" at a joint symposium between Korea and the Republic of China, held in Taipei on August 1-5, 1977.

   g. Dr. Ouh and Professor Young Chi Chang conducted a seminar on "Management and Technical Improvement for Small Business." Organized by the Korea Medium Industry Bank, this seminar attracted representatives of some 40 industrial firms.

   h. A seminar was conducted on "Management Improvement" for the Korea Communications Instrument Manufacturing Industry Association. Some 50 persons representing manufacturing firms attended.

i. A joint seminar was conducted with the Korea Federation of Small Business on "The Present and Future Role of Small Business in the Korean National Economy," attended by 100 persons.

j. SJU conducted two seminars for the Korean Credit Guarantee Fund on "Technology Improvement for Small Industries." About 120 members of the Fund's staff attended one of these seminars.

k. Dr. Seyeul Kim was nominated to be and is now a consultant to the Taejon Branch of the Korea Credit Guarantee Fund.

l. Dr. Seyeul Kim was nominated to become and is now an economic advisor to the Association of Industry Men in Taejon.

m. Dr. Seyeul Kim was nominated to become a member of the Advisory Committee for the Christian Children's Fund.

The Regional Development Institute on the Taejon campus received the donation of over 160 textbooks from the Asia Foundation. Subjects covered included economics, city planning, and regional development. These volumes constituted a significant addition to the RDI's reference library.

Training Programs

Five seminars were conducted for managers and staff members of small industrial concerns. These included a seminar on "Management and Technical Improvement for Small Business," sponsored by the Korea Medium Industry Bank. Representatives came from over 40 firms.

Some 50 managers, engineers, and owners attended the second presentation of a seminar, "Management Improvement," for the Korea Communication Instrument Manufacturing Industry Association. The first presentation occurred in 1976.

A seminar on "The Present and Future Role of Small Business in the Korean National Economy" was presented to 100 small business owner/managers. This program was jointly sponsored by SJU and the Korea Federation of Small Business.

Two seminars on "Technology Improvement for Small Industries" were presented before a total of 120 personnel of the Korea Credit Guarantee Fund.

Dr. Seyeul Kim of the RDI presented his lecture on "Regional Development" to ten classes of the Korea Government Officials' Training Institute, held in Seoul, during 1977.

Educational Activities

A number of programs were carried out for the purpose of providing training for the faculty and students of SJU. The RDI conducted the following:

A three-hour seminar on "Regional Development" was conducted on November 15, 1977, with almost 300 students, faculty, and other interested persons in attendance. Two of the three papers presented at this meeting were by students of SJU/Taejon.

A seminar on "Future Forecasting" was presented on February 22, 1977, by Dr. Samuel N. Barzarkay of the Tel Aviv University in Israel. Participants included SJU students and faculty members as well as local government officials, industry representatives, and the press.

A course in "Development, Cooperation, and Labour Studies" was held June 7-11, 1977. This was a joint venture of the RDI, the Korea Cooperative Education Institute, and the International Institute for Development Cooperation and Labour Studies, Tel Aviv, Israel. It was attended by the students of the RDI.

RDI presented a seminar on the "Fourth Korea Five-Year Economic Development Plan," in cooperation with the Korea Economic Planning Board. Participants included SJU faculty and students, and local government and industry representatives.

Mr. Chong Bonk Choi also completed the one-year program at the Settlement Study Centre and is now studying at the Asian Institute of Technology in Thailand.

A course in "Regional Development in Korea" was presented as a joint program by the RDI and a faculty member from Lewis and Clark College, Portland, Oregon. This was attended by 17 students from the latter institution from April 30 to June 30, 1977. It included lectures by the universities' faculties and by administrators and practitioners from various institutions and organizations involved in regional development.

Mr. Tae Myong Kim has been awarded a full scholarship, including air fare and living expenses, for a two-year Master's degree program in Human Settlement Planning and Development at the Asia Institute of Technology, Thailand. He will begin this program, funded by the Asia Institute of Technology, in 1978.

Dr. Bum Soe Koh, president of SJU, traveled to Guatemala City in September 1977 to attend a four-day conference, "Issues Related to Small Industries Appropriate Technologies." Sponsored by GIT and attended by representatives from 10 of GIT's 11 counterpart organizations, this conference proved an ideal format for quickly acquainting the newly appointed president of SJU with a comprehensive view of small industry programs in these other LDCs. Following the Guatemala City conference, Dr. Koh traveled to Atlanta to meet with Dr. Pettit, President, GIT; Mr. Ross Hammond, Director, Office of International Programs, GIT; and other GIT officials. The meetings provided an opportunity to discuss this joint SJU/GIT program and to explore ideas for potential future joint programs.

The RDI sponsored a seminar, "The Trend of Regional Development in the World," before approximately 100 students and faculty members. This was a presentation by Mr. Kyong Bae Park, Researcher, RDI, of the study report which he completed while in residency at the Settlement Study Centre in Israel between December 1976 and November 1977. All expenses for Mr. Park's training were paid by the Settlement Study Centre. Mr. Park is now working with small-scale industries in the Taejon area under this SJU/GIT program.

Dr. William M. Sangster, Dean, College of Engineering, Georgia Institute of Technology, Atlanta, Georgia, worked with Soong Jun University during the period May 2-7, 1977. Dr. Sangster conferred with officials at Soong Jun University and the Office of Education for Korea of the USAID/Korea. Dr. Sangster's work primarily concerned accreditation of the engineering schools in Korea. He presented two seminars at Soong Jun University -- one to the administrative heads of the Engineering Department of Soong Jun University and the second to approximately 20 deans of other engineering schools in Korea. Dr. Sangster also accompanied various members of the SJU extension staff on visits to small industries and spoke to various groups in Korea about the solar energy research being conducted at Georgia Tech.

Other Activities

The SJU/GIT small industry grant program has generated other significant activities of benefit to SJU. Some of these are not quantifiable. Specifically, it is difficult to assess the increased respect SJU has acquired from its work with small-scale industries and its association with GIT. However, OIP personnel have been told by Korean students and faculty that Korean university students have come to realize that the engineering education at SJU is of high quality and commands academic, industrial, and governmental respect. This is demonstrated by the approximately 600 applicants who took a qualifying examination in November 1977 for about 80 student openings in the industrial engineering department.

Other quantifiable benefits include the following:

1. The Presbyterian Church in the United States granted SJU $8,500 for an Anti-Hunger Program, which included support for the greenhouse and biogas generator projects.

2. The Korean Credit Guarantee Fund has granted some $10,000 for industrial extension services for 1978.

3. The Korean Federation of Small Business granted some $10,000 for industrial extension services for 1978.

4. The Korean Ministry of Education granted $5,000 in 1977 for research on wind power.

5. The Scholarship Foundation of the Korea Traders Association provided $3,000 in 1977 for research related to industrial extension activities, with a somewhat greater amount of money expected for support of 1978 activities.

6. SJU officials expect to receive additional funds from the Asia Foundation for work in appropriate technology.

SJU has published four reports during 1977. The RDI was responsible for three, as follows:

"A Case Study on the Possibility of Improving Simple Traditional Farm Equipment in Korea," available only in Korean, but with work on an English version now under way.

Theory and Practice of Community Development, a book published in Korean.

A pictorial monograph on the cheegay, published in Korean in 1977 and to be published in English by GIT in early 1978.

In addition, "Model Curriculum for a Department of Community and Regional Development" will be published in 1978 under a grant from the Korea Ministry of Education.

The Seoul campus published "A Case History of Industrial Extension Service (Sam-Shin Sewing Machine Company)."

GEORGIA INSTITUTE OF TECHNOLOGY ACTIVITIES
DURING PROGRAM YEAR IV

The activities of the Office of International Programs under Year IV of the program were initiated by the Project Director on January 10, 1977, when the sponsor advised the Georgia Institute of Technology that the small-scale industry project for Korea would be extended another year. From mid-February to early March, Mr. Richard Johnston provided on-site assistance in the project. He was followed by Dr. William M. Sangster, Dean, School of Engineering, during May 2-7. Dr. L. Harlan Davis and Mr. Ross W. Hammond visited on October 14. Ms. Edwina Ware and Mr. Donald E. Lodge worked at SJU November 13-27. Dr. Bum Soe Koh, President, Soong Jun University, attended the Guatemala City conference and visited OIP in Atlanta during September.

February 14-March 8, 1977 (Mr. Richard Johnston)

Mr. Johnston worked with SJU staff on their industrial extension services to small-scale industry. He assisted the SJU staff in the acquisition of contract work for SJU from the Korean Credit Guarantee Fund. The Project Plan for Year IV was prepared, as shown in Figure 2.

May 2-7, 1977 (Dr. W. M. Sangster)

Dr. Sangster presented two seminars concerning accreditation of engineering schools to the heads of Korea's engineering schools. He also visited a number of small-scale industries with the SJU staff.

September 6-10, 1977 (Dr. Bum Soe Koh)

As President of Soong Jun University, Dr. Koh represented his university at the Guatemala City Conference on "Issues Related to Small Industries Appropriate Technologies." This conference was attended by representatives of other institutions working under the Small Industry Grant program and of the OIP counterpart institutions. Ten LDCs were represented at this meeting.

September 11-14, 1977 (Dr. Bum Soe Koh)

Dr. Koh visited OIP at Atlanta, Georgia, where he met with the OIP staff and other high officials of GIT with whom he discussed the small-scale industry program at SJU, future cooperative efforts between the two institutions, and possible funded contract work for SJU/GIT in Korea.

Figure 2

PROJECT PLAN

Project No. B-426 - Year IV

Project Title SIG - Soong Jun University

Project Director Nelson C. Wall

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Start Year IV (January 10, 1977)												
Project Organization and Planning												
On-Site Assistance - R. Johnston												
Technical-Management Assistance												
Solar Energy, Small-Scale Industries												
Appropriate Technology												
Linkages and Information Exchange												
Training-Planning and Implementation												
Data Support (EDL)												
On-Site Assistance - R. Johnston												
On-Site Assistance - D. Lodge												
Audiovisual Documentation												
Staff Training (EDL)												
Quarterly Reports												
Annual Report												

LEGEND

October 14 (Dr. L. H. Davis and Mr. R. W. Hammond)

Dr. Davis and Mr. Hammond visited SJU to introduce Dr. Davis to SJU and to discuss SIG activities. Mr. Hammond was in Korea at the invitation of the Korea Federation of Small Business to present a paper before the Fourth International Symposium on Small Business, held in Seoul on October 10-14, 1977.

November 13-19 (Ms. Edwina Ware)

Ms. Ware conducted the Year IV audiovisual documentation of the SJU SIG program.

November 13-26 (Mr. Donald E. Lodge)

Mr. Lodge participated in the audiovisual documentation, provided consultation and training and, together with Dr. Ouh, Counterpart Project Director, compiled annual report data.

RESULTS AND CONCLUSIONS

The fourth year of this small-scale industry development program continued the progress of previous years. In this section, the major accomplishments of Year IV will be highlighted.

1. The professional staff at SJU again conducted an in-depth survey of small-scale industries in the program. These companies received technical assistance services from SJU during 1977. In summary, 120 new jobs have been created in Year IV, an increase of 14.8%.

2. The joint SJU-GIT team provided technical assistance to a total of 28 small-scale industries, of which 13 were in Seoul and 15 in the Taejon area. This assistance was accomplished by 109 on-site plant visits.

3. The SJU staff designed a second-generation solar collector panel using indigenous materials, with the ultimate goal of developing a prototype collector which can be produced in Korea. The SJU staff also erected and tested a windpower-driven water pump. An experimental hothouse and water heater were built to demonstrate the use of solar power for heating.

4. Field testing of the prototype "cheegay" was completed and a manufacturer has been located who will build 500 units for test marketing during 1978. The SJU Taejon staff also developed a semiportable methane gas generator which utilizes animal dung.

5. SJU established working linkages with the Korean Credit Guarantee Fund, the Korean Federation of Small Business, the Korean Ministry of Commerce and Industry, and the Korean Medium Industry Bank. The staff provided services to the above-listed institutions in capacities such as management consultants, technical and managerial information resources, and management and technical extension assistants.

6. Dr. Ouh served as Secretary-General of the Korean Committee for the Korea Federation of Small Business' Fourth International Symposium on Small Business.

7. Dr. Ouh presently serves as a member of the Small Industry Development Policy Committee of the Korea Ministry of Commerce and Industry.

8. Dr. Ouh delivered the keynote address on "Small Industrial Development Problems in Developing Countries" at a joint symposium between Korea and the Republic of China, held in Taipei.

9. Professor Young Chi Chang and Dr. Ouh conducted five seminars on "Management and Technical Improvements for Small Business" to representatives of 40 industrial firms.

10. SJU conducted the second annual seminar on "Management Improvement" to 50 persons representing firms of the Korea Communications Instrument Manufacturing Industry Association.

11. A joint seminar, attended by 100 persons, was conducted jointly with the Korea Federation of Small Business on "The Present and Future Role of Small Business in the Korean National Economy."

12. SJU conducted two seminars, attended by about 120 staff members, for the Korea Credit Guarantee Fund on "Technology Improvement for Small Industries."

13. Dr. Seyeul Kim became a consultant to the Taejon Branch of the Korea Credit Guarantee Fund.

14. Dr. Seyeul Kim became an economic adviser to the Association of Industry Men in Taejon.

15. Dr. Seyeul Kim became a member of the Advisory Committee for the Christian Children's Fund.

16. The Regional Development Institute on the Taejon campus received a donation of over 160 textbooks from the Asian Foundation.

17. Dr. Seyeul Kim presented lectures on regional development to ten classes of the Korea Government Officials' Training Institute, held in Seoul.

18. RDI presented a seminar on regional development to some 300 students and faculty of SJU.

19. RDI conducted a seminar on future forecasting, led by Dr. Samuel N. Barzarkay of the Tel Aviv University.

20. The students of RDI attended a course on "Development, Cooperation and Labour Studies" jointly sponsored by RDI, the Korea Cooperative Education Institute, and the International Institute for Development Cooperation and Labour Studies.

21. RDI presented a seminar on the Fourth Korean Five-Year Economic Development Plan.

22. RDI presented a course in regional development to 17 students from the Lewis and Clark College.

23. Mr. Tae Myong Kim was awarded a fully paid scholarship for a two-year master's program at the Asian Institute of Technology in Thailand.

24. Mr. Chong Bonk Choi completed a one-year program at the Settlement Center and is now studying at the Asian Institute of Technology in Thailand.

25. Dr. Bum Soe Koh attended a four-day conference in Guatemala City concerning "Issues Related to Small Industries Appropriate Technologies."

26. Dr. Bun Soe Koh met with Dr. Pettit, President of Georgia Tech, and other GIT officials to discuss past and future activities between SJU and GIT.

27. Dr. William M. Sangster, Dean, College of Engineering, Georgia Institute of Technology, advised SJU engineering administrators and 20 other deans of engineering colleges in Korea concerning accreditation.

28. RDI published three publications in 1977, as follows: "A Case Study on the Possibility of Improving Simple Traditional Farm Equipment in Korea," Theory and Practice of Community Development, and a pictorial monograph on the cheegay.

29. The Seoul campus published "A Case History of Industrial Extension Service (Sam-Shin Sewing Machine Company)."

Appendix 1

SUMMARY OF TECHNICAL ASSISTANCE CASES

SUMMARY OF TECHNICAL ASSISTANCE CASES
1977

Seoul Area

Name of Firm	No. of Visits
Chun-Il Motor Parts Manufacturing Company	12
Sam Hongsa Limited	4
Dong Bang Machinery Company	2
Seoul Precision Engineering Company	2
Sam Ho Wood Working Machine Company	6
Sam Wom Industrial Company	6
Sam-Shin Sewing Machine Company	8
Kwang Shin Machine Company	1
Sam Yang Chain Company	1
Han-Kook Textile Company	2
Kook-Je Industrial Company	3
Nam-Il Milling Machine Company	4
Nam-Sun Lathe Company	3
	54

Taejon Area

Keum Nam Industrial Company, Ltd.	6
Huk Shin Chemical Company	4
Dong-A Pencil Industrial Company	3
Hapsung Textile Company	5
Measung Agricultural Chemicals Company	2
Kyung In Moolsan	3
Chang Ik Industrial Company	6
Han Mi Paint Company	5
Tae-A Industrial Company	2
Sam Sung Sodium Chloride Company	3
Tae-Gwang Oxygen Company	2
Tae-Dong Food Industrial Company	2
Dae Won Food Company	4
Han Mi Towel Company	7
Hong-Do Food Plant	1
	55

CASE NO. 1 | MAIN PRODUCT: STEERING AND SUSPENSION SYSTEM PARTS FOR MOTOR CARS

Municipality: Seoul

Brief Description of Problem

Inefficient materials-handling processes; lack of production control procedures; absence of cost-accounting system; need for improvements in methods.

Applied Solution

In cooperation with the staff of the company, process charts, route sheets, master material lists, and other basic control records were compiled for eight standard manufactured products. As a basic measure for materials-handling improvement, the use of standardized tote boxes was strongly recommended and eventually adopted. Layout and assembly methods in the final assembly section were improved. The practice of assigning job orders and job numbers was introduced, and a new reporting procedure which identifies and reports man-hours and materials consumed according to job order was installed.

An employee training program was completed to disseminate the basic knowledge of work method improvement for all employees and to create a cooperative atmosphere for further implementation. A total of 153 employees attended five sessions.

After the company received a 65-million-won order from the procurement agency of the Korean Ministry of Defense, it was decided to use this opportunity to test the proposed cost-accounting system on this order prior to a full-scale introduction of the costing system. The test results were compiled by SJU and presented to the company, enabling the company to:

1. determine actual costs and cost differences for each product;
2. understand the relative weight of each cost element;
3. secure national measures for reducing costs;
4. compile cost data, such as expenditure of unit man-hours consumed, variable and fixed costs of the company, etc.

CASE NO. 2 MAIN PRODUCT: SCALE-MODEL RAILROAD LOCOMOTIVES

Municipality: Seoul

Brief Description of Problem

A problem occurred in the fabrication of a subassembly which prevented final product assembly for roughly 60% of a product run.

Applied Solution

Analysis of the unassembled models determined errors in the parts design and imperfections at the intermediate inspection stage. Systematic measures were established to prevent a recurrence of this problem.

Practical instructions were given to the management concerning quality control techniques such as Pareto-analysis, C.E. diagrams, and process capability. Instructions were given concerning the statistical methods of quality control and X-R control charts.

A proposal was discussed concerning the organization of a department of technical management and effective ways to utilize it.

CASE NO. 3 MAIN PRODUCT: LATHES AND MILLING MACHINES

Municipality: Seoul

Brief Description of Problem

Lack of gauges and measuring devices resulted in imprecise work.

Applied Solution

Instructions were given regarding the measurement of accuracy of lathes and milling machines using K.S. standards and the use of measurement apparatus. In addition, practical demonstrations and instructions were given concerning problems in sectional measurement.

The SJU team demonstrated that gauges are efficient when products of the same size and shape are measured, and instructions were given in the techniques of gauge manufacturing.

(Continued)

CASE NO. 3 (Continued)

Applied Solution (Continued)

Instructions also were given in techniques to follow when putting a test bar in the head stock to set up the automatic tolerance mechanism.

The product and material control department was instructed in how to establish controls for stock regulation and materials flow. This department was also assisted in the establishment and application of a parts numbering system.

Instructions were given in the techniques of manufacturing jigs and fixtures and of testing and product inspection.

Products of an inferior quality were investigated to determine which processes and operators were causing the defects. The inferior products were identified by inspection and by recording these defects on checklists designed to identify systematically the offending process. Necessary measures were then made to reduce the production of inferior products.

CASE NO. 4 MAIN PRODUCT: FIRE WARNING DEVICES AND ELECTRONIC COMPONENTS

Municipality: Seoul

Brief Description of Problem

The need to make room for additional equipment and a high rate of defective or unsuitable finished items.

Applied Solution

The SJU team prepared a drawing of a proposed layout, based on a study of the effect of the addition of new machinery on the arrangement of existing machine tools.

Instructions were given in the techniques of inspection necessary to achieve a standard product. Standards were drawn up for the inspection system required for each of the various products.

The percentage of unsuitable products was reduced by giving assistance in the manufacture and utilization of gauges for simple measurements of raw materials and assemblies.

CASE NO. 5 MAIN PRODUCT: WOODWORKING MACHINES

Municipality: Seoul

Brief Description of Problem

The need for a catalog of woodworking machines manufactured by the company.

Applied Solution

The mechanism and characteristics of the five kinds of woodworking machines produced by the company were examined and various features of each machine were photographed. The text of the catalog describing each machine was prepared, using the data and photographs obtained by investigation and study. In addition, an English language catalog for export is being prepared.

CASE NO. 6 MAIN PRODUCT: P. V. C. JACKETS

Municipality: Taejon

Brief Description of Problem

Personnel problems concerning the wage structure, communications, decision making, and promotion criteria.

Applied Solution

The SJU team recommended that the company combine a time rate plan with a simple rate plan and divide the employees in groups based on similarity of work on the production line. The members of each group would compete among themselves with respect to production, output, absentee rate, quality of work, and other factors. The group rating highest in the above respects would be rewarded with wage increases. This arrangement would provide an effective base on which to build a quality control program.

Recommendations also included the establishment of a system whereby information could flow easily not only from the top down, but also from the bottom up. This would enable employee grievances to reach management without significant delay.

Additonally, it was suggested that management share some of the less significant decisions with the middle managers, and that employees be selected for job assignments strictly on the basis of personal qualifications.

CASE NO. 7 MAIN PRODUCT: PIGMENTS

Municipality: Choong-Nam

Brief Description of Problem

An improper pH value was retarding production output.

Applied Solution

The SJU team recommended that the acidity of the solution in the reactor be maintained above pH 3.0 to attain maximum production. It was suggested that production also might be increased by properly utilizing the relatively high concentration of ferric ion in the residual solution. A recommendation that a continuous reactor system be utilized has been partially implemented.

CASE NO. 8 MAIN PRODUCT: PENCILS

Municipality: Taejon

Brief Description of Problem

Management wished to improve its method of producing demineralized water and to substitute local raw materials for imported materials.

Applied Solution

The SJU team provided information regarding the use of carbon fiber in making pencil lead and the replacement of imported montmorillonite for pencil lead with Korean montmorillonite. Both suggestions are now either under consideration or in the experimentation stage.

A suggested method of regenerating waste ion-exchange resin in preparing demineralized water is now being utilized.

CASE NO. 9 MAIN PRODUCT: TOWELS AND COTTON TEXTILES

Municipality: Taejon

Brief Description of Problem

Uneven color dispersion and spot formations in the printing process.

(Continued)

CASE NO. 9 (Continued)

Applied Solution

The SJU team recommended the use of a cationic form of surfactant as a dispersion agent in order to prevent spot formation. The firm has not yet implemented this suggestion, but it has adopted the recommendation to treat the water used in the dyeing process in order to achieve a more satisfactory product.

CASE NO. 10 MAIN PRODUCT: AGRICULTURAL CHEMICALS

Municipality: Taejon

Brief Description of Problem

Dust in the air and chemical pollution of the finished products.

Applied Solution

The company followed the team's recommendation to seal the entire process line to eliminate dust pollution. The company plans to install the recommended automatic or semi-automatic bottling process. A recommendation that the company determine the effective contents of agricultural chemicals has yet to be implemented.

CASE NO. 11 MAIN PRODUCT: BOILER COMPOUND AND COMBUSTION HELPING AGENT

Municipality: Taejon

Brief Description of Problem

Management requested information on making boiler compounds, on conditioning industrial water, and on a combustion-helping agent for bunker-C fuel oil.

Applied Solution

The SJU team was able to provide information on ways of making a boiler compound which would prevent scale from forming on boilers, on a method of conditioning industrial water, and on a combustion-helping additive for bunker-C fuel oil which would increase the energy efficiency of the company's boiler.

CASE NO. 12 MAIN PRODUCT: TOBACCO PRODUCTS

Municipality: Taejon

Brief Description of Problem

This company formerly made bicycle parts but is now interested in providing products for the tobacco industry.

Applied Solution

The company is now studying the establishment of a new plant to manufacture thin tobacco sheets (micro-flake), using a Korean patented process developed by a member of the SJU team.

CASE NO. 13 MAIN PRODUCT: PAINT AND VARNISH

Municipality: Taejon

Brief Description of Problem

The determination of the proper ingredients to use in a new paint for making traffic lanes.

Applied Solution

The SJU team recommended that a melamine-based coating material should be used for this paint and that a study of fluorescent dyes is essential to the selection of proper raw materials. Both recommendations are under consideration.

CASE NO. 14 MAIN PRODUCT: PIANOS AND WALL CLOCKS

Municipality: Seoul

Brief Description of Problem

Inefficient layout and irregular flow of materials; lack of standards for various operations; and poor quality control, production methods, cost control, working conditions, and woodworking process methods.

(Continued)

CASE NO. 14 (Continued)

Applied Solution

Following discussions with top management about the overall problems, the SJU team prepared operation process charts and a layout diagram for the skeleton manufacturing process (a piano consists of skeleton parts, action and hammer parts, keyboard parts, and other miscellaneous outer parts).

For each subcomponent of the skeleton, flow process charts (including standard operation methods) were then developed.

Relevant procedures and forms were formulated and proposed to estimate direct manufacturing costs which would enable the company to collect data about man-hours used and in-process inventory.

During the provision of extension services for this company, four undergraduate IE students from SJU were heavily involved, making the necessary measurements and collecting data.

The SJU team and participating students developed overall flow process charts for the piano process. New forms for collecting the man-hours data and yield data were devised by the SJU team. Although the data accumulated are far from sufficient to yield precise figures, the company is now in a position to at least calculate rough manufacturing costs.

Most of the woodworking processes produce heavy dusts which the ventilating system in the factory was unable to handle. With the help of SJU, the company was able to improve the ventilation system without excessive expenditures.

Finally, the SJU team proposed a series of improvements in the woodworking process, including a new plant layout.

CASE NO. 15 MAIN PRODUCT: SEWING MACHINES

Municipality: Seoul

Brief Description of Problem

The company needed assistance in determining where to locate new machine tools, devising job standards for the new machines, and in setting up the machines and instructing the employees regarding their operation.

(Continued)

CASE NO. 15 (Continued)

Applied Solution

This company purchased a set of new machine tools. SJU made detailed measurements and developed an actual layout plan using cardboard templates. After minor adjustments, the proposed plan was adopted and the machinery was installed.

Before the installation of the new machines, SJU helped to develop a series of job standards and carried out work measurement for new operations.

Some of the new machines were equipped with hydraulic power drives, and the company had no experience with hydraulic mechanisms. SJU officials and other experts called in by the SJU team solved the problems, got the machines operating, and instructed company employees on how to operate the machines.

CASE NO. 16 MAIN PRODUCT: CATERPILLAR PINS AND BUSHINGS

Municipality: Seoul

Brief Description of the Problem

The firm was experiencing difficulty in getting an acceptable product.

Applied Solution

Rockwell hardness tests were performed by the SJU team on samples of the pins and bushings. After the recommended heat treatment was applied, samples showed quality improvements from 53-50 to 61-59 by C scale. Based on the SJU team suggestion, the carburizing treatment effect was improved by development of an indirect heating system so that the carburizing furnace maintained a constant temperature.

Processing time was reduced about 20% and the inferiority rate about 10% by production of standardized goods through use of jigs and the development of gauges for precision manufacturing. The accuracy of the manufactured products was improved through precision tests of the firm's machine tools and their subsequent readjustment.

CASE NO. 17 MAIN PRODUCT: STEEL CABLE AND DOUBLE CABLE CHAIN: BRASS SOLDERED CHAIN

Municipality: Seoul

Brief Description of Problem

The firm was producing an inferior quality of chain.

Applied Solution

The SJU team determined that the problem was caused by excessive vibration in the plant machinery. It was able to reduce the rate of inferiority from 16% to 9% through the installation of shock absorbers. The team also has begun work on the development of an automatic system for the machines which will stop them when vibration reaches a critical level.

CASE NO. 18 MAIN PRODUCT: TOBACCO PROCESSING

Municipality: Taejon

Brief Description of Problem

An improper slurry concentration was causing production problems.

Applied Solution

The SJU team recommended the use of an adhesive material such as ethyl cellulose, gum guanic, or methyl cellulose to increase the concentration of slurry.

CASE NO. 19 MAIN PRODUCT: PURE SODIUM CHLORIDE

Municipality: Taejon

Brief Description of Problem

The firm wished to dispose of materials and to shorten the waste crystallization time.

(Continued)

CASE NO. 19 (Continued)

Applied Solution

The SJU team recommended and the firm adopted the use of a conveyor system to transport raw sodium chloride into the purification tank. The team also suggested a temperature control method to shorten crystallization time, which the firm plans to act on. The team also recommended and the company adopted a method of utilizing the waste salt water.

CASE NO. 20 MAIN PRODUCT: OXYGEN

Municipality: Choong-Nam

Brief Description of Problem

Utilization of the sodium hydroxide solution produced as a by-product.

Applied Solution

The SJU team recommended utilizing the waste sodium hydroxide solution for soap making or for other processing purposes. The company subsequently was able to find a buyer for this by-product.

CASE NO. 21 MAIN PRODUCT: SALTED VEGETABLES

Municipality: Choong-Nam

Brief Description of Problem

The plant management wanted to increase production and to decrease product drying time during the winter.

Applied Solution

The SJU team recommended the use of a revised cutting tool and the use of a hothouse for drying during the winter season. The firm is in the process of applying both recommendations.

CASE NO. 22 MAIN PRODUCT: COTTON FABRICS

Municipality: Seoul

Brief Description of Problem

Quality control problems involving sizing preparation and loom shuttle timing.

Applied Solution

The SJU team explained the X-R and X-S control charts and instructed management as to how to examine and analyze these charts. The team also instructed them on how to time the shed and adjust the shuttle boxes on the looms.

CASE NO. 23 MAIN PRODUCT: GUT STRINGS FOR TENNIS RACKETS

Municipality: Seoul

Brief Description of Problem

The company needed technical advice concerning cohesion solvent, heat treatment, and finishing.

Applied Solution

The SJU team recommended the use of a mixture of phenol (85%) and methanol (15%), to which is added a dash of cresol and formic acid. The team also recommended a heat treatment for 5 minutes at 160°C and the use of paraffin wax for waxing.

CASE NO. 24 MAIN PRODUCT: MACHINE TOOLS

Municipality: Seoul

Brief Description of Problem

Machine tools parts were not being produced accurately and the finished products were rusting.

(Continued)

CASE NO. 24 (Continued)

Applied Solution

The SJU team instructed employees on the need for and use of formal drawings and provided instructions on the technical theory and use of production fixtures and jigs. They also explained methods of using gauges in manufacturing and inspecting. The team recommended the use of a double nut mechanism to remove backlash in the machining table screw. The management was provided with instructions on use of the Parkerizing process for rustproofing iron and steel. They were also instructed on methods for drawing up system and velocity diagrams for the spindle change mechanism and on how to determine gear strength and teeth for each change mechanism.

CASE NO. 25 MAIN PRODUCT: MACHINE TOOLS AND LATHES

Municipality: Seoul

Brief Description of Problem

Management requested assistance in the casting of lathe beds, improving the plant layout and material flows, quality control, and in measurements and standards.

Applied Solution

The SJU team recommended the application of a numbering system for all parts and the testing and inspection of all purchased parts and materials. They explained the development of fixtures and jigs, their use in manufacturing, and the need for precision manufacturing. Finally, they provided instruction on the technical methods and essential points of casting, such as thickness, involved in the elimination of internal stress in the cast parts.

CASE NO. 26 MAIN PRODUCT: SOYBEAN CURD

Municipality: Tae Duck-Koon

Brief Description of Problem

The high cost of raw materials, utilization of by-products, and short product shelf life.

(Continued)

CASE NO. 26 (Continued)

Applied Solution

The SJU team suggested the use of defatted soybeans as a raw material, because bean curd made with 50% soybean and 50% defatted soybean has the same protein quality as that made of soybean only. It was suggested that the waste bean curd water be sold as a feed for domestic animals, because it contains 0.4% protein and 0.1% crude lipin. The team recommended the use of dilute acetic acid (0.15%-0.20%) in a preservation process that would allow the bean curd to be stored at 30°C for about 100 hours.

CASE NO. 27 MAIN PRODUCT: TOWELS

Municipality: Choong-Nam

Brief Description of Problem

Poor product quality, due to hard water and bleaching problems, and plant air pollution.

Applied Solution

The SJU team provided information about industrial water treatment of underground water to provide the soft water needed in the dyeing process and concerning the use of hydrogen peroxide in the bleaching process. Both of these suggestions were implemented. The team also suggested setting up a dust machine to eliminate cotton fiber dust in the air, but management felt this would be prohibitively expensive. Cost data will be supplied during 1978.

CASE NO. 28 MAIN PRODUCT: CASTINGS

Municipality: Choong-Nam

Brief Description of Problem

The firm required better quality control in order to increase usable production.

(Continued)

CASE NO. 28 (Continued)

Applied Solution

The SJU team informed company management that the yellow pigment used in the making of pickled radishes is harmful to humans and recommended a method of making pickled radishes without using this pigment. The team also pointed out the necessity of keeping the working room clean in order to keep the product sanitary.

Appendix 2

COMMUNITY DEVELOPMENT THROUGH SMALL BUSINESS

COMMUNITY DEVELOPMENT THROUGH SMALL BUSINESS
A KOREAN CASE OF SAEMAUL MOVEMENT

Presented by

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Before the 4th International Symposium on Small Business
held in Seoul, Korea, October 10-13, 1977

1. The predominant problem commonly facing most developing countries is to wipe out the vicious cycles of poverty. Development efforts to this end can be approached through the use of available resources and skilled labor and in the choice of strategy and techniques.

2. However, there is an almost universally accepted feeling among developing country planners and policymakers that industrialization is the most effective way to eliminate their economic handicaps, to achieve a substantial growth of output, and to raise the standard of living of their populations. Therefore, "the standard development strategy of the past two decades emphasized rapidly increased marginal savings, investment, and employment in the modern sector of industry. It generally limited its agricultural concerns to the production of commercial crops to feed urban populations and earn foreign exchange. Its explicit or implicit premise was that it would produce significantly higher marginal rates of savings and investment than alternative strategies, and that the growth of the modern manufacturing sector would eventually ease whatever unemployment problems were developing in rural areas and traditional urban sectors as a result of the concentration of incentives in the modern sector." (1)

2. In pursuing such a development strategy, the highest priority was generally given to the approach which was thought to ensure a high economic growth rate. Given the conditions of capital shortage at the early stages of development, development policymakers deliberately promoted rapid expansion of large-scale industries in view of high productivity, the economy of scale, and other advantages stemming from modern machinery utilization, technology development, marketing techniques, methods of management, and quality control. In other words, they found it very difficult to justify the allocation of scarce resources to small industry sectors in proportion to their large-scale counterparts.

3. As a result, industrial development policies which give preferential treatment to large-scale industries have allowed those industries to almost monopolize the protective measures and other assistance provided by the national governments. The widening gap between small-scale and large-scale sectors and the phenomenon of this economic dual structure in helping the larger get larger and making the small get pettier has resulted in more waste and more problems than anticipated. Furthermore, the urban-centered development strategy of modern industrial sectors has created wider opportunities. In short, the development strategy of the past two decades, which emphasized GNP growth, has failed

not only to provide more employment opportunities for low-income people, especially in nonurban areas, but also to make significant contributions to their standard of living.

5. From the beginning of the 1970s, therefore, government policymakers and development planners became conscious of the serious problems that arose from these sectoral and regional disparities, and began to think of development as an integrated process involving not only economic growth as such, but also the development of social objectives of economic growth, such as income redistribution, institutional changes, equalization of employment opportunities, and the development of especially backward rural areas. It is now widely accepted that successful development cannot be measured in terms of increased GNP and per capita income alone. Rather the indication of successful development is growth along with advances in these social objectives.

6. The Saemaul Undong, the New Community Development Movement, emerged out of this conceptual rethinking and change in development strategy. The Saemaul Undong was aimed at making a rural village a better place to live, through the villagers' own efforts to create a better environment, and to raise the standard of living. The Saemaul Movement developed into a nationwide campaign immediately after President Park Chung-Hee stated in April 1970: "A village can develop rapidly when its villagers are strong in the sense of self-support. Otherwise, a village will hardly be able to escape the poverty inherited from the past 5,000 years. If determined villagers make concerted efforts and do something for community development with the participation of all citizens, I shall see to it that the government provides the necessary support. We may call such a drive a campaign for Saemaul making or a campaign for decent village making." (2)

7. From the beginning, the Saemaul Movement has given top priority to the action programs or projects which could yield spiritual enlightenment, improvement of the living environment, and increased income. As one writer commented, "The Saemaul Movement goes beyond agricultural sector development in that it aims at improvement of the rural environment, changes in the way of thinking, and improvement of the standard of living in addition to seeking increases in the level of production." (3)

8. Of various programs designed to increase farm income through the Saemaul Movement, much emphasis has been placed on the importance and usefulness of the

Saemaul factory (rural small-scale industry) as an instrument of integrated rural community development for equitable distribution of income, employment opportunities, and social services through the people's active participation in the achievement of growth.

9. It is generally assumed that the problems of rural unemployment during and between the farming seasons can be effectively tackled by development projects which employ highly labor-intensive techniques. At the early stage of the Saemaul Movement, the government recommended the following projects: (4)

a. Reforestation of surrounding mountains.
b. Widening of roads connecting the villages to the main road.
c. Repair of river banks near the villages.
d. Construction of manure storage facilities.
e. Repair of small pond reservoirs.
f. Repair of irrigation ponds.
g. Cleaning of village paths and ditches.
h. Construction of public laundry facilities.
i. Rodent control.

10. Later, the Saemaul Factory Movement, not only as a development project but as an effective instrument of rural community development, was introduced alongside the ongoing development projects and efforts aimed at an increase in the production of food grains. It was generally assumed that a Saemaul factory, once established in a rural area, would generate a new source of employment opportunity, both for tapping otherwise unused human and local resources and for more widely and equitably distributing the benefits of growth. It is further assumed that Saemaul factories and other related small businesses which come into being as a result of this movement will provide an effective means of stimulating indigenous entrepreneurship, checking the flow of rural population into the already congested urban centers, decentralizing industrial growth geographically, and helping accelerate capital formation in the rural areas.

11. With a view to achieving these multi-objectives, the government has adopted numerous incentive measures to induce local investment as well as to stimulate the urban industrialists' active participation in the Saemaul Factory Movement in rural areas. Thus, basic infrastructures, administrative services, financial support, tax concessions, and other services were provided in each of the major towns with a population of less than 20,000 in order to stimulate the establishment of Saemaul factories in those areas.

12. More specifically, the following guidelines were laid down: (5)

a. Types of industry to be promoted:

(1) industries for which it is possible to procure raw materials in the rural areas, such as food and beverages; wood and wood products; clay, stone products and ceramics; and paper products.

(2) industries where the production process is simple and labor-intensive industries, such as textiles, sundry goods, synthetic resin products, and glass products.

(3) industries where subcontract relations between small and large firms can be promoted, such as metals, machinery and tools, parts and components.

(4) other industries which may contribute to the increase of farm incomes.

b. Promotional measures to be taken:

(1) provision of equipment and working capital loans to finance the construction and operation of the Saemaul factories.

(2) subsidization of the construction of Saemaul factories in model villages.

(3) subsidization of the training of skilled workers and the development of technology.

(4) provision of concessions in property and acquisition taxes.

(5) assistance to small industries through government purchases.

(6) development of local industrial estates to attract existing small industries or new industries to the rural areas.

(7) establishment of home industry centers to assist rural cottage industries by furnishing such services as training of skilled workers, joint purchase and sales, quality control of the products, and information.

13. It is generally agreed among development experts that in countries like Korea where labor is abundant and low cost owing to rapid population growth, rapid strides in industrial development can be achieved by building on small industries which rely for their steady growth upon the requirements mentioned above -- especially those of labor intensiveness and low investment. Some years ago, UNIDO identified the following advantages of helping existing small industries and promoting new ones in rural areas: (6)

a. Small industrial enterprises provide an effective means of stimulating indigenous entrepreneurship;

b. They can channel the skills of traditional craftsmen into new lines suited to modern economy;

c. They help with the unemployment problem since many small industrial establishments lend themselves to capital-saving methods;

d. They make it possible for the growth of industry to be less concentrated geographically;

e. They assist in diversification of the industrial structure;

f. They can help to tap resources which would otherwise remain unused and thus accelerate capital formation.

12. Like any other development effort, the Saemaul Factory Movement, as an instrument of community development in the rural areas, should be viewed as a long-range strategy requiring systematically organized knowledge and methodologies for successful implementation. Thus, few worthwhile results would be expected from a short-range view. As far as quantitative aspects of results are concerned, however, the Saemaul Factory Movement, since its inception in 1973, has had some positive tangible effects on the Saemaul Movement or New Community Development in terms of employment opportunities, income distribution, and contribution to the national drive to increase exports.

15. As of September 1976, 465 Saemaul factories were newly established throughout the country, with the effects as shown in Table 1.

16. Table 1 shows that in the first year of the Saemaul Factory Movement 17,000 new jobs were created in the nonmetropolitan areas. Resulting new jobs created annually almost tripled by the end of September 1976, totaling 47,000 jobs. It was reported that some of the Saemaul factories fell short of expectation in output, due mainly to the shortage of workers during the farming season. This problem has been eased as agricultural mechanization has progressed. To sum up, the role of the Saemaul factory is noticeable in absorbing the farm unemployed who would otherwise come to urban centers to seek employment. It can be said that the Saemaul Factory Movement is one of the effective answers to the problem of rural unemployment which stems from the seasonal nature of agriculture and the effects of agricultural mechanization.

17. In addition, the rural people now have access to new or additional income opportunities. Until recently, the disparity in incomes between the rural

Table 1

EFFECTS OF THE SAEMAUL FACTORY MOVEMENT, 1973-1976

	1973	1974	1975	1976*
(A) Employment (1,000)	17 (-)	22 (29.4)	34 (54.5)	47 (38.2)
(B) Total Wages (Million Won)	956 (-)	3,570 (273.4)	7,716 (116.1)	11,393 (47.7)
(C) Average Monthly Wage per Worker (Won)	13,146 (-)	21,525 (63.7)	30,729 (42.8)	36,800 (19.8)
(D) Exports (US$1,000)	23,498 (-)	56,963 (142.4)	87,132 (53.0)	123,563 (41.8)
(E) Production (Million Won)	9,940 (-)	26,703 (168.6)	56,444 (11.4)	80,009 (41.7)

* January-September only.

Note: Figures in ( ) show percentage increase over the previous year.

Source: R.I.D. Center, Saemaul Factory, Vol. 21 (June 1977), p. 31.

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and urban sectors, owing mainly to the urban-centered development strategy in nonagricultural sectors, was very significant, showing a considerably lower rate relative to the average urban wage earner. As noted in the following table, average farm household income was 60% of the average urban wage earner's income in 1967 and 67% in 1970. This relationship has reversed since 1974, and the Saemaul Factory Movement is one of the factors contributing to the rapid increase in farm incomes. In the first year of the Saemaul Factory Movement, the average farm income per month was 13,146 Won (equivalent to US$30) in 1973. This increased by 42.1% over the next three years, amounting to 36,800 Won (equivalent to US$80) in September 1976. The total production output made by Saemaul factories in the first year, 1973, as shown in Table 1, constituted 0.2% of gross national product (GNP) for that year. The ratio of total Saemaul factory output to GNP rose to 0.6% at the end of 1975. Its share in the total farm and fishery output increased from 0.8% in 1973 to 2.4% in 1975. (8)

18. With regard to the role of the Saemaul factory in national export, in 1973 their total exports reached US$23,498,000, corresponding to 0.73% of the nation's total exports.

Table 2

AVERAGE INCOME OF FARM AND URBAN WAGE EARNERS' HOUSEHOLDS (7)
(1,000 Won)

Year	Farm (A)	Urban (B)	A/B (%)
1965	112	113	99.1
1966	130	162	80.3
1967	149	249	59.8
1968	179	386	62.6
1969	218	334	65.3
1970	256	381	67.2
1971	356	452	78.8
1972	429	517	83.0
1973	481	550	87.5
1974	674	647	104.5
1975	873	859	101.6

Sources: Ministry of Agriculture and Fisheries, Report on the Result of Farm Household Economy Survey, 1975; and Economic Planning Board, Monthly Statistics.

The total export of the Saemaul factories has steadily increased, reaching 1.71% of the total export in 1975. Regarding exports, it should be noted that most of Saemaul factory products, being labor intensive and utilizing local resources, afford comparative advantages in international competition relative to capital-intensive products made of imported raw materials.

19. In addition, the Saemal Factory Movement has made significant contributions to the implementation of the government's industrial dispersal plan in the regional areas. As shown in Table 3, it was reported that as of September 1976, 53 Saemaul factories had been established in 23 cities out of a total of 34 regional cities in Korea (67.6%). On the average, two Saemaul factories were built in each city. As regards the towns, 412 Saemaul factories were set up in 264 towns, or in 28.1% of the total of 1,468 towns of less than 20,000 population. As mentioned before, it is government policy to induce at least one Saemaul factory to locate in each town. It is only a matter of time until this target is achieved.

Table 3

DISTRIBUTION OF SAEMAUL FACTORIES AMONG CITIES, TOWNS, AND COUNTIES

	Cities	Towns	Counties
Total Number of National Administrative Units (A)	34	1,468	138
Number of National Administrative Units in which there were Saemaul Factory Locations (B)	23	264	100
Number of Saemaul Factory Establishments	53	412	
B/A	67.6%	16.0%	

Source: R.I.D. Center, op. cit., p. 32.

20. It should be mentioned before ending my comments on the effects of the Saemaul Factory Movement that the infrastructures laid down primarily for the purpose of implementing the Saemaul Factory Movement also contribute significantly to improvement in the quality of rural life, through rural electrification, expansion of rural roads and water supply, the establishment of social services for workers, and other improvements in village living conditions. "It is also facilitating specialization of production and the enhancement of complementary and linkage effects between rural and urban industries in support of the nation's goal of industrial dispersion." (9)

21. Given the state of our present knowledge, we can conclude that if community development is viewed as a process of improving the quality of life, through greater productivity and increased access to resources and services, then the Saemaul Movement in general and the Saemaul Factory Movement in particular are an effective strategy for fostering community solidarity, for organizing and delivering basic social services, and for stimulating and consolidating social change and development in the rural areas. This is the lesson which we can learn from the Korean Saemaul Movement.

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(3) Sung Hwan Ban, "The New Community Movement," in Chuk Kyo Kim (ed.), Industrial and Social Development Issues, Essays on the Korean Economy, Vol. II (Seoul, Korea: Korea Development Institute, 1977), p. 211.

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(5) For more detailed information, see The Medium Industry Bank (Korea), Policies for Small Industry: Current Status (1974) and Quarterly Review, 1st Quarter, 1973.

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SMALL–SCALE INDUSTRY GRANT YEAR III

SOONG JUN UNIVERSITY ACTIVITIES

Grant Period: January 10, 1976 to January 9, 1977

A PROGRAM FUNDED BY THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

FINAL REPORT
YEAR III

SOONG JUN UNIVERSITY
SMALL-SCALE INDUSTRY GRANT

by

Yoon Bae Ouh

and

Donald E. Lodge

Contract No. AID/ta-c-1062

International Programs Division
Economic Development Laboratory
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
January 1977

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INTRODUCTION

On January 31, 1976, the Agency for International Development (AID) funded, for the third consecutive year, Contract No. AID/ta-c-1062, through which the Georgia Institute of Technology (GIT) was to make available $45,000 grants for small-scale industry development programs to four institutions of higher learning in different geographic regions of the world. Three of the four grants would be for the continuation of existing programs with counterparts selected in 1974 and 1975; the fourth grant would be for a new counterpart to be selected in 1976.

Of the three grants for the continuation of existing programs, one went to Soong Jun University (SJU) in Seoul, Korea. This document is the final or end-of-the-year report for the work jointly performed by the staff of SJU in Korea and GIT in Atlanta, Georgia.

When the grant was initiated in 1974, the administration of GIT and the sponsor established the following criteria for the selection of grantee institutions:

1. Suitability of the national macroeconomic framework for local business conditions.
2. Existence of practicing or potential entrepreneurs.
3. Community concern over unemployment.
4. Existence of potential markets for additional products.
5. Linkages (current or potential) with educational, financial, and business communities.
6. Quality of the staff.
7. The institution's potential for utilizing the grant effectively.
8. Potential multiplier effects.
9. Host government commitments.

After an initial worldwide search, Soong Jun University was one of the first two institutions selected and the corresponding grant was established. The final report for the first year of the program was published in 1975 under the following title: Yoon Bae Ouh and Nelson C. Wall, <u>Final Report -- Soong Jun</u>

University, Small-Scale Industry Grant (January 10, 1974 to January 9, 1975), Industrial Development Division, Georgia Institute of Technology, Atlanta, Georgia, January 1975. The final report for the second year of the program was published in 1976 under the title, Yoon Bae Ouh and Nelson C. Wall, Final Report Year II, Soong Jun University, Small-Scale Industry Grant (January 10, 1975 to January 9, 1976), Economic Development Laboratory, Georgia Institute of Technology, Atlanta, Georgia, January 1976.

At the end of Year III of this program, the following immediate results are indicative of the work performed:

1. A survey of 17 firms receiving technical assistance from SJU during 1976 shows an increase of 159 jobs, or a 24% increase over the 12-month period.

2. Thirty-three companies were provided with technical assistance during the year -- 10 in Seoul and 23 in the Taejon area.

3. One member of the SJU team participated in a four-week training program conducted by GIT at its facilities in Georgia.

4. Audiovisual documentation of this Small Industry Grant program was continued with coverage of both old and new cases.

5. Three case histories in technical assistance were prepared.

6. A Methodology for Case Study and Case History Preparation was compiled.

7. A training and development seminar for small manufacturers of communication instruments was held with 48 in attendance.

8. A member of the GIT team assisted in a review of the SJU Department of Industrial Engineering.

9. Gaps existing in the industrial engineering reference and textbook collection at SJU were identified and a substantial number of books were subsequently donated by GIT faculty members.

10. The SJU/GIT team emphasized appropriate technology. During Year III, an additional five pieces of appropriate technology hardware were developed and eight software applications were recorded.

11. The Small-Scale Industry Information Center (SSIIC) was incorporated into the SJU Engineering Library and reactivated with the appointment of a Data Manager.

12. The Data Manager for the SSIIC received five weeks of training at the East-West Center regarding data collection management for small-scale industry libraries.

13. One new organizational linkage was formed during the year -- with the Korea Communication Instrument Manufacturers Association.

14. SJU received almost $70,000 in research grants from five organizations during Year III, the largest, for $50,000, to be spent over 1½ years.

PROGRAM PLANS FOR YEAR III

Background

Soong Jun University (SJU) is a prominent Korean institution of higher learning with strong programs in science, engineering, and management-oriented fields. This university was formed in 1970 when Soong Sil College united with Taejon College to form a new cooperative venture in the field of Christian education. Soong Sil College, in turn, was formed in Pyeng Yong (North Korea) in 1897 and reopened in Seoul in 1954, after being closed in 1938 during the Japanese occupation. Taejon Presbyterian College was founded in 1956 by the Southern Presbyterian Mission in the city of Taejon.

Shortly after Dr. Hahn Been Lee became President of Soong Jun University in 1973, he was contacted by Mr. Ross W. Hammond, Director, Economic Development Laboratory (EDL) of the Engineering Experiment Station at the Georgia Institute of Technology. As a result of these contacts, both institutions established an agreement of mutual cooperation on July 30, 1973.

SJU then presented a proposal to the Georgia Institute of Technology for a program of development for small-scale industries. It was implemented by a grant funded under an existing contract provided to the Georgia Institute of Technology by the Agency for International Development (AID) for this purpose. In 1974, the EDL, in cooperation with SJU, initiated Year I of a program of small-scale industry development. This program was expanded in 1975 (Year II) and continued in 1976 (Year III) under funding by the same sponsor.

The terms of the $45,000 grant permitted the grantee to use half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The remainder of the funds was to be used by the grantee to obtain training and consultation from U. S. technical assistance organizations.

The Georgia Institute of Technology and the Technology and Development Institute, East-West Center, subsequently contracted with the grantee to provide training services and an audiovisual documentation of the project.

The Integrated Development Center (IDC) of Soong Jun University was assigned the responsibility for all program activities for Year III and served as a counterpart to the International Development Branch of EDL (now the International Programs Division).

At the time the Year III program was initiated (on January 10, 1976), the SJU organizational structure was as presented in Figure 1.

Dr. Hahn Been Lee, President of Soong Jun University (SJU), named Dr. Yoon Bae Ouh, Head of the Integrated Development Center (IDC), to serve as Counterpart Project Director. Mr. Nelson C. Wall is Project Director and Mr. Richard Johnston is Project Coordinator for Georgia Tech's portion of the program.

Objective

It is the continuing objective of this project to build a program of industrial extension for small-scale industries at Soong Jun University. Three main areas of activity were considered for Year III: (1) provision of technical and managerial assistance to small-scale industries in defined geographic areas of the Republic of Korea, (2) development of simple solar energy devices, (3) strengthening the relevancy of the existing educational program of the university, and (4) provision of training activities for small-scale industry.

At the end of this multi-year project, the sponsor anticipates that SJU will have in operation a well-trained staff that will be fully capable of continuing the provision of technical assistance services to small-scale industries in the area. This service will be provided by the then technically competent members of the SJU indigenous staff trained under this program.

Total Project Goals of the AID/ta-c-1062 Contract

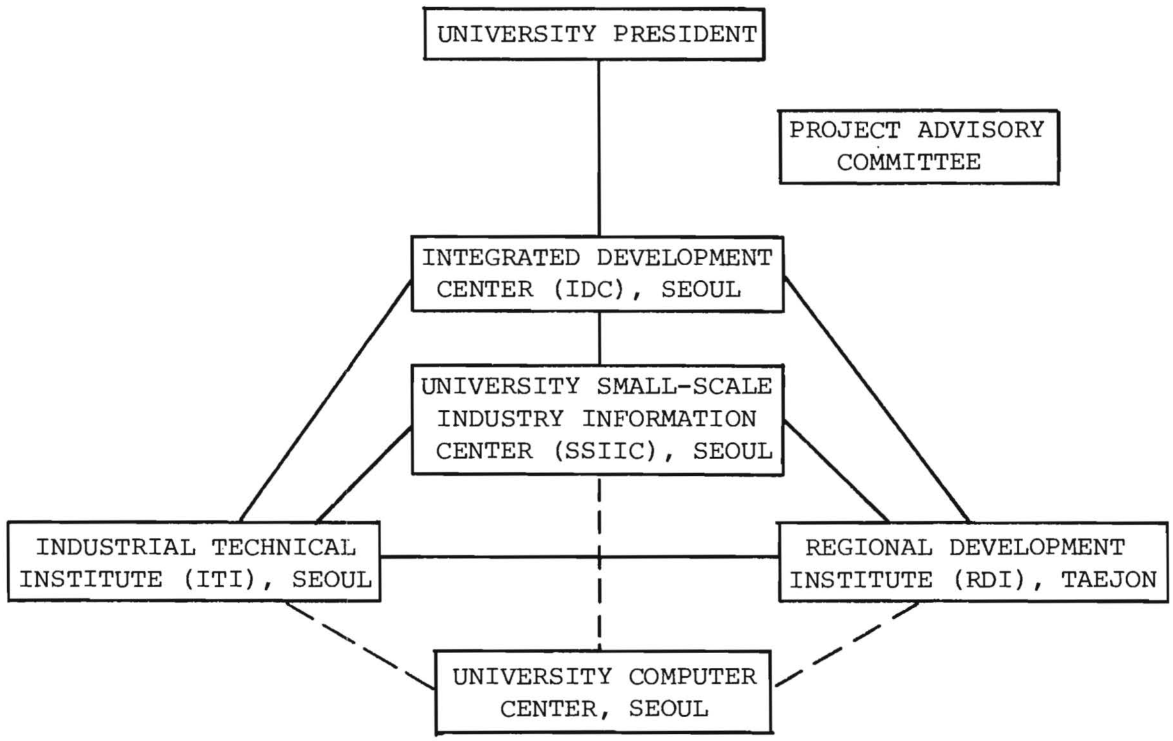
At the start of the Small-Scale Industry Grant on January 23, 1974, the following total goals had been established by the Agency for International Development for the Georgia Tech grant, to be achieved over a period of four years:

> The general objective of this contract is to generate employment in developing countries, particularly outside the metropolitan centers, by: (a) strengthening the capability of a selected institution in each country to provide effective technical assistance to local small industry, (b) demonstrating and documenting the impact of alternative approaches to technical assistance to small industry, and (c) infusing the governmental, industrial, and financial sectors of the local community selected to provide employment with an understanding of the techniques of generating jobs. The above objectives will be carried out through the use of grants to selected Lesser Developed Country (LDC) organizations.

Once the total project goals are reached, the sponsor anticipates the following outputs:

Figure 1

ORGANIZATIONAL STRUCTURE OF SOONG JUN UNIVERSITY
(January 1976)



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1. Increased job opportunities in four countries.
2. Increased viability of indigenously owned enterprises.
3. Improved capability of four LDC institutions to serve small industry.
4. Tested methodologies for strengthening LDC institutions.
5. Evaluation reports on successes and failures in assisting small industry.

All the established goals for Year III were met, plus several additional accomplishments which were listed in the Introduction and will be amplified in the balance of this final report.

Program of Work

The Year III proposal presented a program of work on the basis of the work that had been implemented and evaluated during the second 12 months of the project. The following activities were then scheduled for the third 12-month sequence (Year III), most of which have been implemented:

1. Industrial Training and Education. The successful short-term training programs conducted during Year II will be followed by others during this year. They will be offered to small industry managers, engineers, and to entrepreneurs in general. These programs will include:

a. Continued training seminars involving an interchange of SJU and EDL professional staff.

b. An assessment of the joint program on science and engineering education at SJU.

c. Continuation of the written and audiovisual case histories initiated during Year I.

d. Management seminars on site for interested small industries, managers, and administrative staff.

e. Additional staff training in accordance with needs.

2. University Training and Education. As a result of activities initiated in Year I and continued through Year II, a new Industrial Engineering Department has been established at SJU. The further development of this department will be a priority during this program year.

The professional staff of EDL will be made available as needed for further consultation in areas such as:

a. Continued preparation of classroom material and course work for the Department of Industrial Engineering.

b. Continued review and modification of the departmental curriculum.

c. Identification of specific effects on university education policies and practices as a result of these industry-oriented educational programs.

The on-site EDL staff will be made available to the academic staff of SJU for consultation on additional matters that may arise.

3. Industrial Extension and Research Service. The past two years have placed SJU in a position of leadership in this area of activity. It is proposed that EDL assist the SJU staff in carrying out the following activities:

a. Chemical and electrical engineering capacity for industrial extension activities will be developed further.

b. The industrial engineering and management assistance facilities at both the Seoul and Taejon campuses will be expanded.

c. Emphasis will be placed upon the areas of quality control, general plant and production management, and marketing assistance.

d. Special emphasis will be placed on effective energy management by Korean small-scale industry. The joint SJU/EDL staff will seek, review, and implement, if possible, the use of solar energy applications in behalf of small-scale industry users. It is anticipated that this activity may eventually evolve into the development of appropriate Korean technology in solar energy applications.

Use of Grant Funds by SJU

For the 1976-1977 grant year, the grantee was funded in the amount of \$45,000. These funds were disbursed in the following manner:

	Funds by Source (dollars)			
Expenditures	AID 1/	Ind.-Univ. Foundation 2/	SJU 3/	Total (dollars)
Direct Salaries and Wages	\$ 9,952	\$5,250	-	\$15,202
Travel				
International	4,500	-	-	4,500
Local	2,474	750	-	3,224
Materials/Supplies	3,647	-	-	3,647
Conferences/Seminars	1,927	-	-	1,927
Contracted Services (GIT/IDC)				
SJU Personnel Training	10,500	-	-	10,500
EDL Consulting	10,000	-	-	10,000
TDI (East-West Center)				
Audiovisual Documentation	2,000	-	-	2,000
SJU Indirect Expenses				
General Overhead	-	-	\$ 8,000	8,000
Technical Service Support	-	-	3,000	3,000
Totals	\$45,000	\$6,000	\$11,000	\$62,000

1/ From AID Small-Scale Industry Grant.
2/ The Industry-University Cooperation Foundation is an organization in Korea designed to promote mutual cooperation from which SJU applied for and received a grant.
3/ Normal overhead allowance plus depreciation allowance for use of university labs and workshops.

SOONG JUN UNIVERSITY ACTIVITIES DURING PROGRAM YEAR III

The SJU staff, on both the Seoul and Taejon campuses, carried out the major portion of the work programmed for Year III. The following sections highlight some of the activities for the year.

Industrial Training and Education

As part of the program of work in this area, a four-week training program was scheduled and presented, beginning on July 10, 1976, at the EDL headquarters in Atlanta, Georgia. SJU sponsored one participant in this program -- Mr. Byoung-Kyu Choi, Acting Chairman of the Department of Engineering.

The four weeks of training included two weeks in Atlanta and two weeks of visits to industrial plants and rural small-scale industries in the state of Georgia. Appendix 1 of this report provides a listing of subjects covered during the training, as well as an outline of the week of activity in Atlanta. Through this exposure to EDL's industrial extension service facilities and the methodology presented during the training program, the participant will be able to increase his input to the SJU small-scale industry development program.

Under the program for Year III, the audiovisual documentation was continued by a staff member of the East-West Center, Hawaii, from September 19 to September 24, 1976. The audiovisual for Year III covers some of the technical assistance cases and some selected new cases. These audiovisual materials are available to other interested organizations.

Three case histories dealing with technical assistance were prepared: The Sam-Ho Woodworking Machine Manufacturing Company, Low-Cost Tensile Strength Tester and Immersion Pyrometer, and Sam-Shin Sewing Machine Company. (See appendices 4, 5, and 6.) Dr. David E. Fyffe of GIT compiled a Methodology for Case Study and Case History Preparation for use by the SJU/GIT staffs. (See Appendix 3.) Dr. Fyffe also counseled and advised Mr. Choi during the time Mr. Choi was preparing the case on the Sam-Shin Sewing Machine Company.

A significant event during Year III was the Training and Development Seminar for Small Firms in the Communication Instrument Manufacturing Industry. This seminar was jointly conducted by the Korea Communication Industry Cooperative Union and the Industry Development Institute, SJU, on August 16-20. Forty-eight participants -- engineers, owners, and managers -- attended, representing

24 firms. The seminar presented both the engineering and management aspects of this industry. Indicative of the success of this program is the fact that 80% of the participants stated that this seminar assisted them in solving company problems and that they wished to see more programs made available to them.

University Training and Education

When this program was initiated in 1974, it was determined that since SJU was a technologically oriented institution, it would be desirable to assist it in expanding its engineering programs to include industrial engineering. It was anticipated that through such an extension, future SJU graduates could participate more usefully in the industrial development of the nation.

As a result of this action, by the end of 1974, the appropriate national authorities allowed SJU to establish the Department of Industrial Engineering as part of the College of Engineering at SJU. The Dean of Engineering, Dr. Clarence E. Prince, has worked closely with the EDL academic staff during Year III to enhance the existing program being offered by the Department of Industrial Engineering.

Dr. David E. Fyffe, Professor in the School of Industrial and Systems Engineering, GIT, was in South Korea for three weeks during Year III. During his stay he was able to provide assistance in a review of the SJU Department of Industrial Engineering. He also identified gaps in the available industrial engineering text and reference books on campus and subsequently shipped a number of books which had been donated by GIT faculty members to SJU.

Industrial Extension and Research Activities

This continues to be the main portion of the joint program of work. It was planned originally to provide technical assistance to small-scale industries using the industrial extension service approach. This part of the program also covers instances of applied research activities which have been incorporated into the total project. According to the records of the SJU staff, during Year III, 10 different companies were provided technical assistance in the Seoul area and another 23 companies in the Taejon area were so served. A listing of the companies serviced, with particulars on each case, is presented as Appendix 2 of this final report.

Effective energy management was one area to be emphasized by the SJU staff during Year III. Appendix 2 contains a number of cases in which suggestions were made concerning energy-saving techniques. Many involved the use of exhausted heat for some in-plant operation, thereby utilizing what otherwise would have been wasted.

Employment Generation

Another interesting development in the Year III program conducted by the SJU staff was a survey of 17 companies (7 in Seoul and 10 in Taejon) that had received technical assistance at some time during 1976. The survey's purpose was to determine the employment changes within the selected assisted industries. It shows a gain of 133 new jobs in the Seoul area companies and 26 in the Taejon area companies for a total of 159 jobs, or a 24% increase over the original 651 jobs at the start of the year. A summary of the survey results, as reported by SJU, appears as Tables 1 and 2 of this report.

Appropriate Technology

The Year III program continued to emphasize the area of appropriate technology, particularly those technologies relevant to the needs of the Korean communities involved in the project. Although Korea is an industrial society, much of the production continues to be small-scale by international standards. The unique conditions of the Korean culture and the need for intensive labor solutions to the individual problems make it mandatory that appropriate technology choices be made in providing a solution to a given situation.

Since the start of this program, the joint staff has been able to design, build, and field test nine devices which are considered by the staff to be appropriate technology for the small-scale industry sector of the host country.

These devices are:

- A low-cost tensile strength tester
- A sizing or shaving die for truing up metal rod cross sections
- A low-cost immersion pyrometer
- A wheeled version of the "chegae," the traditional means of backpack transport of materials
- A flat-plate solar collector
- A multi-tapping machine
- A drilling fixture

Table 1

SUMMARY OF EMPLOYMENT CHANGES OF SURVEYED COMPANIES
ASSISTED BY SOONG JUN UNIVERSITY, SEOUL, 1976

Technical Assistance Case No.	Employment, End of 1975	Employment, End of 1976	Variance
B	14	21	+ 7
D	14	29	+15
E	142	155	+13
F	36	40	+ 4
G	30	43	+13
H	52	74	+22
J	39	98	+59
Total	327	460	133

Source: Soong Jun University, Survey Data, Fourth Quarter, 1976.

Table 2

SUMMARY OF EMPLOYMENT CHANGES OF SURVEYED COMPANIES
ASSISTED BY SOONG JUN UNIVERSITY, TAEJON, 1976

Technical Assistance Case No.	Employment, End of 1975	Employment, End of 1976	Variance
A	38	14	-24
C	32	23	- 9
D	77	95	+18
F	56	60	+ 4
H	25	26	+ 1
I	13	18	+ 5
J	3	5	+ 2
K	5	12	+ 7
L	45	66	+21
M	30	31	+ 1
Total	324	350	26

Source: Soong Jun University, Survey Data, Fourth Quarter, 1976.

- A filter press
- A testing device for bicycle brakes

The last five were developed during Year III.

In addition, a number of software items of appropriate technology were developed, applied, or suggested during Year III. These include:

- An improved plant layout and a system for process control and production planning for use in a machinery plant
- A cost accounting system for a metal products producer
- A quality control chart system for a machinery plant
- A method for controlling the tensile strength in textile production
- Time standards for machining and assembly operations in a metal products plant
- The use of an organic solvent to remove fluorescent substances from waste paper, enabling conversion to wrapping paper for use in export shipments
- A method for using acid clay to decolorize rice bran oil
- A way of utilizing sodium hydroxide and sodium carbonate to reduce the acidity of rice bran oil

Small-Scale Industry Information Center (SSIIC)

This unit was established in 1974, Year I, during which time the EDL on-site staff assisted in establishing guidelines for the classification of the collection and determining the future acquisitional needs. Unfortunately, during Year II, the SSIIC did not meet the original expectations, because the person on the SJU staff responsible for the SSIIC left the SJU campus and the Center was not active during that year.

During Year III, the SSIIC was relocated to the Department of Industrial Engineering, where it became part of the Engineering Library and ceased to be a separate unit. Mr. Chang, Chief Librarian at SJU, was given the responsibility for maintaining the collection. He traveled to the East-West Center for five weeks of training in the collection, documentation, and dissemination of materials related to small-scale industry and the SJU/GIT joint program before becoming the Data Manager for the SSIIC.

Other Activities

A formal agreement for technical assistance and educational programs was signed by SJU and the Korea Communication Instrument Manufacturers Association.

The Korean Economic Planning Board sought SJU's advice and suggestions on small-scale industries for use in the preparation of the Fourth Five-Year Economic Development Policy.

Although it is not possible in every case to verify that any particular program at SJU has caused the school to be invited to participate in other programs or activities, the following can reasonably be cited as possible spin-offs:

1. The Korean Ministry of Education gave the Integrated Development Center a $2,000 grant for the conduct of basic research on community development through technical innovation.

2. The Korean National Federation of Small Industry Cooperatives paid $4,000 toward Dr. Ouh's travel costs and registration fees for the U. S. Small Business Administration's International Symposium on Small-Scale Industry, held in Washington, D. C., on November 15-18, 1976.

3. The Asian Foundation provided a $7,500 grant for the continuation of the development of an improved version of the "chegae."

4. The Southern Presbyterian Church and the United Presbyterian Church gave $50,000 for a 1½-year rural development project to be directed by the Regional Development Institute on the Taejon campus.

5. SJU received $6,000 during 1976 from the Industry-University Cooperative Foundation for its part in a five-year small-industry development program which involves three neighborhood universities. SJU has been designated as the lead institution for this project.

6. Two SJU faculty members were asked to be technical consultants to the Korean National Federation of Small Industry Cooperatives.

7. Dr. Ouh was invited by the Technology and Development Institute of the East-West Center to participate in a week-long RATC Program Evaluation Workshop.

8. The Konrad Adenauer Foundation has expressed interest in funding SJU faculty and student training and education in Germany to expedite the present small-scale industry program.

9. The Industrial Development Research Centre funded Dr. Ouh's attendance at a Pre-Research Meeting on a Regional Comparative Study on Small-Scale Industrial Entrepreneurship which was held in Hyderabad, India. The meeting was conducted by the Association of Development Research and Training Institutes of

Asia and the Pacific (ADIPA), of which the SJU Integrated Development Center is a member.

GEORGIA INSTITUTE OF TECHNOLOGY ACTIVITIES DURING PROGRAM YEAR III

The EDL activities under Year III of the program were initiated by the Project Director on January 10, 1976, when the sponsor advised the Georgia Institute of Technology that the small-scale industry project for Korea would be extended another year. During mid-February to early March, Mr. R. A. Manoff visited Korea to provide on-site assistance in the project. This visit was followed by those of Mr. Edwin L. Lewis, Mr. Ross W. Hammond, Mr. Howard Dean, Mr. Donald E. Lodge, Dr. David E. Fyffe, Mr. Daniel de Castro, and, again, Mr. Donald E. Lodge in October-November. Each of these staff members had a specific task assigned to him within the total goals of the program. Each was funded by this project or by other AID-sponsored programs. A brief summary follows:

<u>February 11-March 12 (Mr. R. A. Manoff)</u>

This staff member had the responsibility of setting up the GIT program of work for the year, as designed by the Project Director, in consultation with the Counterpart Project Director Dr. Yoon Bae Ouh. Different EDL staff members were tentatively assigned to carry out individual tasks. The Project Plan for Year III was prepared, as shown in Figure 2.

<u>May 24-June 12 (Mr. Edwin L. Lewis)</u>

Mr. Lewis was assigned to assist SJU staff members in the design and construction of an experimental flat plate solar collector. During his stay plans were completed, materials were purchased, and the collector was built and set up on the Seoul campus for the purpose of gathering data on its effectiveness. A report on this solar collector appears as Appendix 7.

<u>June 1-June 9 (Mr. Ross Hammond, Mr. Howard Dean, and Mr. Donald E. Lodge)</u>

Mr. Hammond provided administrative guidance and counseling to the Counterpart Project Director and his staff. The other two GIT staff members received orientation regarding the various programs of SJU, including this Small Industry Grant program.

<u>July 10-August 8 (Counterpart Training)</u>

Mr. Byoung-Kyu Choi, Acting Chairman of the Department of Industrial Engineering, participated in a four-week training program at the EDL headquarters in Atlanta and various EDL extension offices around Georgia.

Project No. B-426

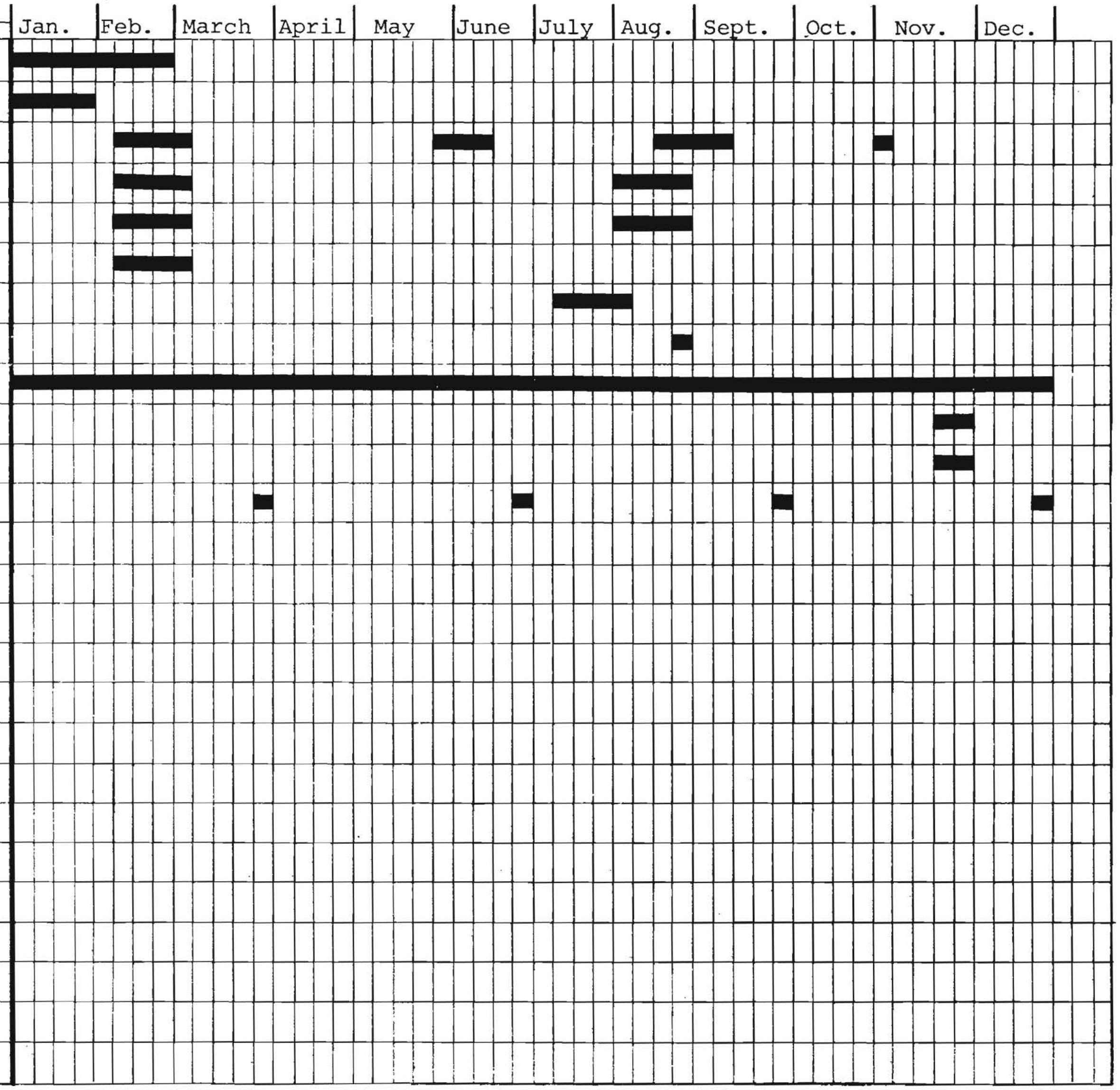
Project Title Small-Scale Industry Program SJU

Project Director N. C. Wall

Figure 2

PROJECT PLAN

SIG-SJU, YEAR III



- Preparation of Final Report Year II
- Planning Year III Program
- EDL Staff on Site
- Industrial Training and Education
- University Training and Education
- Selection of Participants for Train. Prog.
- Training Program in Atlanta
- Audiovisual Filming on Site
- Staff Support to Project -- Atlanta
- Annual Review
- Data Gathering, Final Report
- Quarterly Reports

LEGEND

The training program, as designed by the EDL staff, incorporated various training modes, including classroom activities, on-the-job situations, guidance and counseling, industrial tours, and general small industry exposure within the state of Georgia. The training program also provided information regarding current solar energy technology and experimentation being conducted at Georgia Tech. (See Appendix 1.)

August 23-September 11 (Dr. David E. Fyffe)

Dr. Fyffe was assigned to visit South Korea to assist in the development of a methodology to be used in case histories which were to be prepared by the SJU staff, to provide support to the SJU Industrial Engineering faculty in their development of ongoing industrial extension activities, and to provide assistance in the review and modification of the SJU departmental curriculum. Appendix 3 presents the Methodology for Case Study and Case History Preparation.

September 19-24 (Mr. Daniel de Castro, TDI/EWC)

Mr. de Castro came to South Korea to prepare the Year III audiovisual documentation of the SJU Small Industry Grant program, under a separate AID contract. In addition, Mr. de Castro provided instruction in the operation of audiovisual equipment to Mr. Chang, Chief Librarian, SJU.

September 25-October 31 (Counterpart Training)

Mr. Chang, Chief Librarian at the SJU library and Data Manager for the SSIIC, received five weeks of training on the collection, documentation, and dissemination of materials related to small-scale industry and the SJU/GIT joint program.

October 31-November 7 (Mr. Donald E. Lodge)

This was the last on-site contact by GIT for Program Year III. Mr. Lodge, together with Dr. Ouh, Counterpart Project Director, prepared annual report data for this program year.

November 16-19 (Dr. Hahn Been Lee)

Dr. Hahn Been Lee, President of SJU, visited the EDL headquarters in Atlanta to confer with the GIT Project Director and Project Coordinator regarding the Small Industry Grant program and their matters of mutual interest.

RESULTS AND CONCLUSIONS

The third year of this small-scale industry development program has had many positive results, a number of which were briefly listed in the Introduction of this final report. In this section, the major accomplishments of Year III will be highlighted:

1. The professional staff at SJU conducted an in-depth survey of 17 small-scale industries that are presently in this program. These companies have been recipients of the technical assistance service during 1976. In summary, the SJU survey reports that 159 new jobs have been created, for a 24% increase in employment.

2. The joint SJU-GIT team was able to provide technical assistance to a total of 33 small-scale industries, of which 10 were in Seoul and 23 in the Taejon area.

3. Three case histories in technical assistance were prepared, covering assistance provided to a woodworking machinery manufacturer, a sewing machine manufacturer, and to a group of foundries.

4. A member of the GIT team developed a <u>Methodology for Case Study and Case History Preparation</u>.

5. An additional five pieces of appropriate hardware have been designed, built and tested:

- o a flat plate solar collector
- o a multi-tapping machine
- o a drilling fixture
- o a filter press
- o a testing device for bicycle brakes

6. Eight software items of appropriate technology have been developed, applied, or suggested by the joint SJU/GIT team.

7. A very successful training and development seminar was held, attended by 48 persons from small-scale industries that manufacture communication instruments.

8. The Small-Scale Industry Information Center was incorporated into the SJU Engineering Library and reactivated with the appointment of a Data Manager.

9. The Data Manager of the SSIIC attended a five-week training course at the East-West Center, covering the development, maintenance, and operation of a small-scale industry data collection.

10. Another member of the SJU team participated in a four-week training program conducted by GIT in Georgia. This staff member was able to observe several of the GIT industrial extension offices and to visit firms which have received assistance from these offices.

11. Audiovisual documentation of Year III was filmed during the year, covering several of the technical assistance cases which are described in Appendix 2.

12. SJU received some $70,000 from five organizations, to be used in various development studies and programs. The university's participation in this Small Industry Grant program is believed to be a significant factor in its growing ability to attract support from other sources.

13. A member of the GIT team provided assistance in a review of the SJU Department of Industrial Engineering.

14. The number of engineering reference and textbooks available on the SJU campus was increased through the efforts of the GIT team in identifying gaps in the collection and in securing book donations from GIT faculty members.

15. SJU formed a linkage with the Korea Communication Instrument Manufacturers Association and plans to work closely with that group on matters affecting small-scale firms in that industry.

During the year, not only have these achievements taken place, but more important, the participating small-scale industries in the selected areas have been provided with a service in the technical assistance field which was previously unattainable.

Appendix 1

SCHEDULE OF TRAINING PROVIDED FOR MR. BYOUNG-KYU CHOI BY GIT

SCHEDULE OF TRAINING PROVIDED FOR MR. BYOUNG-KYU CHOI BY GIT

Day	Date	Hours	Activities
Mon.	7/12	0830-1200	EDL Introductory Tour/Welcome - GIT Campus Orientation
		1300-1400	Training Program Review and Planning
		1400-1700	Review GIT Data Facilities - IDDC/BD/PG Libraries Research Assignment Presented
Tue.	7/13	0800-1700	Research Assignments - Complete and Submit Assignment Concerning Solar Literature
Wed.	7/14	0800-1700	Rome Area Industry Visits
Thu.	7/15	0800-1700	Solar - GIT Staff Interaction
Fri.	7/16	0800-1700	On-Site Visits to Local Solar Facilities
Sat.	7/17	0800-1500	Guided Tour - Atlanta Area
Sun.	7/18		Open
Mon.	7/19	0900-1700	Lectures: Factors in Plant Layout/Production Planning and Control for Small-Scale Manufacturing/ Inventory Control - Small-Scale Production
Tue.	7/20	0800-1700	Lectures: Extension Services to Small-Scale Industry/Generation and Evaluation of Venture Ideas/Appropriate Technology
Wed.	7/21	0800-1700	Lectures: Cottage Industries/Development Techniques
Thu.	7/22	0800-1700	Area Plant Visits, Small-Scale Industry, Macon, Georgia
Fri.	7/23	0800-1200	Area Plant Visits, Macon Area
		1300-1700	Independent Research
Sat.	7/24		Open
Sun.	7/25		Open
Mon.	7/26	0800-1700	Depart Atlanta for Douglas, Georgia - Review Industrial Extension Activity and Visit Industrial Plants
Tue.	7/27	0800-1700	Plant Visits, Douglas Area
Wed.	7/28	0800-1700	Depart for Albany, Georgia - Review Extension Activity and Visit Plants

Day	Date	Hours	Activities
Thu.	7/29	0800-1700	Plant Visits - Albany Area
Fri.	7/30	0800-1700	Return to Atlanta for Debriefing and Independent Research
Sat.	7/31		Open
Sun.	8/1		Open
Mon.	8/2	0800-1700	Depart Atlanta for Augusta, Georgia - Briefing and Plant Visits
Tue.	8/3	0800-1700	Plant Visits - Augusta Area
Wed.	8/4	0800-1700	Depart Augusta for Savannah, Georgia - Briefing and Plant Visits
Thu.	8/5	0800-1700	Plant Visits, Savannah Area
Fri.	8/6	0800-1700	Return Atlanta - Debriefing and Independent Research Evaluation
Sat.	8/7		Open
Sun.	8/8		Open
Mon.	8/9		Depart Atlanta

Appendix 2

SUMMARY OF TECHNICAL ASSISTANCE CASES

SUMMARY OF TECHNICAL ASSISTANCE CASES
1976

Seoul Area

Name of Firm	No. of Visits
Sam Shin Sewing Machine Company	32
Yoo Jin Telephone Company	4+
Sam Ho Machine Manufacturing Company	12
Ki-Hung Ironworks Company	2
Yoo-Sung Refined Salt Manufacturing Company	2
Kyung Chang Company	Not Available
Yoo-Jin Textile Company	Not Available
Sam A. Textile Company	Not Available
Dong Seu Electronic Company	Not Available
Sam Hongsa Company, Ltd.	4

Taejon Area

Sam-Sung Industrial Company	Not Available
Yusing Industrial Company	Not Available
Sinsung Paper Mill	Not Available
Sam Won Food Industrial Company	Not Available
Jeil Feed Company	Not Available
Chang-Ik Industrial Company	Not Available
Noun Mining Company	Not Available
Yu-Jun Industrial Company	Not Available
Hyun-Dao Food Company	Not Available
Huk-Shin Chemical Company	Not Available
Sam Won Barium Chemical Company	Not Available
Taejon Oil Industrial Company	Not Available
Sidae Food Industrial Company	Not Available
Ilkwang Vinegar Company	Not Available
Sang Jin Dang Company	Not Available
Hyosung Industrial Company	Not Available
Samil Chemical Company	Not Available
Kookil Trading Company	Not Available
Hapsung Textile Company	Not Available
Iljin Industrial Company, Ltd.	Not Available
National Carbon Company, Ltd.	Not Available
Taepim Food Industrial Company	Not Available
Sona Trading Company, Taejon Branch	Not Available

CASE NO. 1 MAIN PRODUCT: SEWING MACHINES

Municipality: Kyounggi-Do

Brief Description of Problem

Poor quality control, production and process control, and plant layout; delays in tapping operations; high labor turnover; excessive dust in buffing area; and excessive energy consumption in the baking process.

Applied Solution

A multi-tapping machine was designed by the SJU staff; time standards were established for machining and assembly operations; a quality control chart system was developed; the plant layout was substantially improved with a reduction in in-plant travel of approximately 700 km per month; the production flow of arm and bed machining was balanced with a 20% gain in man-hour utilization; test bars were made on campus for use in the quality control program; a system for performing job evaluations and employee performance ratings was suggested; a low-cost ventilation device was proposed for the buffing area; insulation was applied to the baking oven and the burner design was improved to reduce heat loss; and a heat-exchange system has been suggested to tap what is otherwise wasted heat from the baking kiln.

CASE NO. 2 MAIN PRODUCT: TELEPHONE TERMINAL BOXES

Municipality: Seoul

Brief Description of Problem

Too high a percentage of inferior carbon arresters, problems in uniformly cutting carbon holders, and problems in tempering and tensioning springs.

Applied Solution

The electric furnace used in producing the carbon arresters was reconstructed; pitch, graphite, and oil cakes were substituted for pitchcoke, carbon black, and phenol resin; the heat treatment is now being done in two stages; and the cutting pattern and shearing process used in the cutting of the carbon holders were improved.

CASE NO. 3 MAIN PRODUCT: WOODWORKING MACHINES

Municipality: Seoul

Brief Description of Problem

The plant had a poor layout, an inefficient material-handling system, inefficient production planning and process control systems, needed quality control gauges and jigs and fixtures, lacked proper product catalogs, and was unable to meet the Korean Standards (KS) for woodworking machines, without which the firm was unable to export its products.

Applied Solution

The SJU staff prepared a new plant layout, provided assistance with the process control and production planning systems, assisted in the adoption of standard gauges for quality control applications and in the development of jigs and fixtures for mass production assembly, and prepared catalog copy for five products. Prior to intervention by the SJU/GIT team, almost none of the output was able to pass the KS seal, but at the end of the third quarter of 1976, 70% of the output was so marked. Output has increased by 8% as a result of the changes initiated.

CASE NO. 4 MAIN PRODUCT: MILLING MACHINES

Municipality: Seoul

Brief Description of Problem

This firm was experiencing problems in the feed mechanism of its product because of unskilled machine operators and a lack of quality control fixtures.

Applied Solution

The SJU team provided a short-term training program for the machine operators and developed jigs and fixtures. As a result, production increased by 15% and the quality of the products also was improved.

CASE NO. 5 MAIN PRODUCT: REFINED SALT

Municipality: Seoul

Brief Description of Problem

The plant has experienced filtering problems, resulting in undesirable colors and clustered crystals in the refined product.

Applied Solution

The filtering equipment has been replaced with an improved design, on the advice of the SJU team.

CASE NO. 6 MAIN PRODUCT: BICYCLE PARTS

Municipality: Seoul

Brief Description of Problem

The firm was experiencing problems in bending metal tubing, with weak aluminum castings, and in testing bicycle brake assemblies.

Applied Solution

The SJU team was able to suggest a method for the mechanical bending of metal tubing and ways of producing stronger castings and to develop a testing device for the bicycle brake.

CASE NO. 7 MAIN PRODUCT: TEXTILES

Municipality: Seoul

Brief Description of Problem

The firm was having problems in producing textiles with uniform tensile strength, had some unrecognized hazards in the plant, and needed assistance with a costing system.

Applied Solution

The SJU team was able to advise the plant management on ways of producing a more uniform product through better control of ambient temperature and

(Continued)

CASE NO. 7 (Continued)

Applied Solution (Continued)

humidity and through the use of product testing, and to point out hazardous situations present within the plant.

CASE NO. 8 MAIN PRODUCT: TEXTILES

Municipality: Seoul

Brief Description of Problem

This firm was experiencing problems in producing material having a uniform tensile strength and in eliminating or coping with static electricity generated by the machinery.

Applied Solution

The SJU team suggested ways in which the tensile strength of the material could be made more uniform and the generation of static electricity could be minimized.

CASE NO. 9 MAIN PRODUCT: ELECTRONIC COMPONENTS

Municipality: Seoul

Brief Description of Problem

The firm had experienced problems in controlling the speed of direct current electric motors and in locating technicians who could set up and operate a production control system and carry out production planning.

Applied Solution

The SJU team suggested the utilization of a silicon control rectifier for motor control and assisted in the selection of technicians qualified to handle the production planning and control functions.

CASE NO. 10 MAIN PRODUCT: SCALE MODEL LOCOMOTIVES

Municipality: Seoul

Brief Description of Problem

Management wished to determine whether a more expensive type of electric motor was more powerful than the motor they were then installing in the models. The quality of the models was poor because of the employees' lack of understanding of how the finished product should appear. The employees' morale was low, and the firm lacked a good system for production scheduling and control.

Applied Solution

The SJU team provided middle management with training in process control, methods improvement, and performance evaluation. Using torque measuring equipment on the SJU campus, the team determined that the proposed electric motor produced 50% to 140% more torque than did samples of the motor then in use.

CASE NO. 11 MAIN PRODUCT: NATURAL BRISTLE BRUSHES

Municipality: Taejon

Brief Description of Problem

The firm was experiencing problems in the bleaching of pig bristles and in the cutting of the wooden brush handles. The rate of output was reduced by the latter problem.

Applied Solution

The SJU team suggested that the pig hair be bleached using hydrogen peroxide and liquid paraffin, and that the process of cutting the brush handles be speeded up by utilizing a machine rather than using a hand operation.

CASE NO. 12 MAIN PRODUCT: BRAKE FLUID, GREASE AND LUBRICANTS, AND ANTIFREEZE

Municipality: Taejon

Brief Description of Problem

This company was having difficulty in producing an antifreeze that would meet Korean Standard Regulations. Management also was desirous of developing new products for their line of grease and lubricants.

Applied Solution

The SJU team provided an analysis of the automotive grease and suggested quality control procedures by which the firm could meet the Korean Standard Regulations.

CASE NO. 13 MAIN PRODUCT: PAPER

Municipality: Taejon

Brief Description of Problem

This plant needed a chemical analysis of the water it used in its boiler and wanted to attempt to utilize the waste paper resulting from the production of one product. Later in the year, the firm experienced a contamination problem in attempting to use its waste paper for the production of export packaging material.

Applied Solution

The SJU team conducted a chemical analysis of the water, suggested a potential use of the waste paper, and located a method for removing a fluorescent material from the waste paper through extraction, using an organic solvent.

CASE NO. 14 MAIN PRODUCT: SOYBEAN-BASED FOOD PRODUCTS

Brief Description of Problem

Contamination of micro-organisms utilized in the products and related problems.

(Continued)

CASE NO. 14 (Continued)

Applied Solution

The SJU team was able to suggest suitable antiseptics which would permit the production of Chinese-style soypaste during the warmer summer months, moving the packing operation into the polyvinyl chloride building in order to prevent the contamination of the micro-organisms, and a classification control system for the various micro-organisms stored in the plant.

CASE NO. 15 MAIN PRODUCT: POULTRY FEEDS

Municipality: Taejon

Brief Description of Problem

Because most of the materials utilized in mixing these feeds are imported into Korea, the firm wishes to find local materials for substitution in these products.

Applied Solution

The SJU team has developed a research proposal for the investigation of the use of the water-nut in the production of chicken feeds.

CASE NO. 16 MAIN PRODUCT: MOTORCYCLE ACCESSORIES

Municipality: Taejon

Brief Description of Problem

The firm plans to shift production from motorcycle accessories into the manufacture of shoe inner parts and was seeking data on various aspects of the new product.

Applied Solution

The SJU team was able to propose a method for utilizing the by-products of a leather company as a raw material for this plant, to provide information on adhesives and various production processes, and to furnish a method for producing adhesives from urea and aldehyde resins.

CASE NO. 17 MAIN PRODUCT: CHEMICALS

Municipality: Taejon

Brief Description of Problem

The management sought techniques for quality control and ideas concerning the potential markets for the chemicals.

Applied Solution

The SJU team provided suggested methods of quality control and two potential markets for the firm's products -- cosmetic manufacturers and producers of surface coating materials.

CASE NO. 18 MAIN PRODUCT: GREASES

Municipality: Taejon

Brief Description of Problem

The plant management wished to determine the free fatty acid content of automobile grease.

Applied Solution

The SJU team was able to provide an analysis of the free fatty acid content of the grease.

CASE NO. 19 MAIN PRODUCT: FRUIT JELLIES

Municipality: Taejon

Brief Description of Problem

The firm had experienced a problem regarding the drying of a raw material and was also concerned about reducing the amount of wheat flour (an imported item) which goes into the jelly.

Applied Solution

The SJU team provided specific data on drying the raw material and suggested that the firm try using potato or barley flour in place of the wheat flour.

CASE NO. 20 MAIN PRODUCT: PIGMENTS

Municipality: Choongnam

Brief Description of Problem

The firm was concerned about increasing the productivity of ferric oxide from a given quantity of inputs.

Applied Solution

The SJU team suggested several steps which relate to the control of acidity of the solution, which is the key to this process. The suggestions included an investigation of the relationship between acidity and yield, the analysis of the residual solution for ferric ion concentration, an investigation of the relationship between temperature and the reaction rate, and the possibility of utilizing a continuous system reactor rather than the present batch system.

CASE NO. 21 MAIN PRODUCT: BARIUM SULPHATE

Municipality: Choongnam

Brief Description of Problem

The firm desires to increase its output by increasing its efficiency.

Applied Solution

The SJU team proposed that a filter press be used to collect the precipitates rather than the traditional but less effective drying on an iron plate. It was also suggested that a pure grade of barium sulphate be made for use by the medical profession.

CASE No. 22 MAIN PRODUCT: RICE BRAN OIL

Municipality: Choongnam

Brief Description of Problem

The firm wanted to reduce the acidity of its product to below 0.5%, remove the wax from the oil, and decolorize it.

(Continued)

CASE NO. 22 (Continued)

Applied Solution

The SJU team recommended the use of sodium hydroxide and sodium carbonate to reduce the acid content, the use of acid clay and active carbon to decolorize the product, and a way of removing the wax from it.

CASE NO. 23 MAIN PRODUCT: BREAD AND CAKES

Municipality: Taejon

Brief Description of Problem

This firm wanted information on making a variety of breads and cakes and was experiencing problems in preventing its supply of beanjam from spoiling.

Applied Solution

The SJU team provided recipes, a bibliography of books on making breads and cakes, and suggested a method for the sanitary preservation of beanjam.

CASE NO. 24 MAIN PRODUCT: VINEGAR

Municipality: Taejon

Brief Description of Problem

The firm was seeking a way of distilling technical-grade glacial acetic acid and of analyzing vinegar.

Applied Solution

The SJU team was able to provide solutions for both of these problems.

CASE NO. 25 MAIN PRODUCT: BREADS

Municipality: Taejon

Brief Description of Problem

This bakery wanted to locate a method for determining the ratio of various ingredients used in making breads and cakes. It also sought a substitute ingredient for wheat flour, which must be imported.

(Continued)

CASE NO. 25 (Continued)

Applied Solution

The SJU team provided a methodology for determining mixing ratios and suggested that Irish and sweet potatoes might be used to replace a portion of the white flour normally used in bread and cakes.

CASE NO. 26 MAIN PRODUCT: STARCH AND NOODLES

Municipality: Choongnam

Brief Description of Problem

The firm was experiencing difficulty in drying acorn starch.

Applied Solution

The SJU team suggested the use of a vacuum drying process and also that the firm remove the tannin from the acorn for sale as an additional product.

CASE NO. 27 MAIN PRODUCT: PLASTIC DUSTBINS

Municipality: Taejon

Brief Description of Problem

The firm was having problems with the quality of its product and was concerned about the air pollution it was causing.

Applied Solution

The SJU team was able to suggest the use of additives for polymer which would improve the quality of the polyethylene being utilized and the use of inorganic pigments for coloring to prevent the air pollution.

CASE NO. 28 MAIN PRODUCT: POLYETHYLENE FILM

Municipality: Taejon

Brief Description of Problem

The firm was experiencing a problem in the removal of lettering from used polyethylene fertilizer containers which it melts down for the production of polyethylene film. There was also concern that the life of the film, used in making hothouses, was short.

Applied Solution

The SJU team provided the firm with a process for the decolorization of the lettering and with the suggestion that additives for polymer be added to the scrap material in order to improve the strength of the film.

CASE NO. 29 MAIN PRODUCT: TOWELS

Municipality: Taejon

Brief Description of Problem

This firm expressed the need for information as to how they could soften the material from which the towels are made, what they might use as an ink binder that would be less expensive than the present item, and a better way to bleach the threads from which the towels are woven.

Applied Solution

The SJU team was able to suggest a suitable softening agent, a more economical ink binder, and a means for bleaching thread.

CASE NO. 30 MAIN PRODUCT: ACTIVATED CARBON

Municipality: Choongnam

Brief Description of Problem

The firm wished to increase its productivity from a given level of input and to reduce its heating expenses.

(Continued)

CASE NO. 30 (Continued) MAIN PRODUCT: ACTIVATED CARBON

Applied Solution

The SJU team was able to suggest that the relationship between reactor temperature and the air flow rate be studied to determine optimum productivity, that the washing process be improved by using a continuous process, and that heat from the reactor be utilized in other processes within the plant.

CASE NO. 31 MAIN PRODUCT: CARBON BARS

Municipality: Choongnam

Brief Description of Problem

The firm was interested in improving its quality control procedure and in economizing on fuel costs.

Applied Solution

The SJU team suggested that the possibility of using nondestructive, continuous quality control methods be investigated, that the entire production process might be standardized, that binders might be used to improve the quality of the bars, and that the combustion heat of graphite might be utilized in other processes.

CASE NO. 32 MAIN PRODUCT: CHINESE VERMICELLI

Municipality: Choongnam

Brief Description of Problem

The firm was experiencing a problem with the growth of micro-organisms and wished to speed up the drying time for the product and to reduce heating costs.

Applied Solution

The SJU team was able to suggest the use of a sterilization lamp to prevent mold and other micro-organisms, the use of a hothouse in place of the traditional drying process using the wind and the sun, and the addition of a combustion-additive to the fuel oil to increase the Btu output.

CASE NO. 33 MAIN PRODUCT: TOYS

Municipality: Taejon

Brief Description of Problem

The firm was experiencing a problem in the screen-printing process and had excessive acrylic fiber dust present in the air.

Applied Solution

The SJU team was able to suggest the use of a low-concentrated printing ink composed of water soluble pigments in the screen-printing process and the use of a dust-removing machine to eliminate the acrylic fiber dust from the air.

Appendix 3

METHODOLOGY FOR CASE STUDY AND CASE HISTORY PREPARATION

METHODOLOGY FOR CASE STUDY AND CASE HISTORY PREPARATION

For our purposes there is a difference between case histories and case studies.

Case History

The case history is used both for instruction and documentation. The case history for instructional purposes records in detail a chronology of events. It should begin with background information concerning the historical development of the firm, its products, markets, management, and the current operating situation (including the listing of problems perceived by management). In effect, this portion of the case history should serve as a baseline against which to place the improvement activity. Data, illustrations, and other graphic material should be used where appropriate.

Following this background presentation, the particular problems with which SJU faculty became involved should be discussed in detail and the solution development should be described. It is important to describe in candid detail the complete process through which the solution was reached. False starts and failures should be included so that as far as possible the case history accurately presents professional practice. This permits the student an opportunity to come as close to personal involvement in professional practice as is possible prior to actual field experience. The key point, it should be emphasized again, is to factually describe the baseline situation in detail and then to present the activities leading to problem solution, including, if possible, the experiences of implementation. Photographs, drawings, and illustrations enhance the presentation.

The use of the case history for instructional purposes permits the students to "look over the shoulder" of a professional while he solves a problem. Classroom discussions focus on the problem analysis, the completeness of the set of alternatives which were considered, the procedure by which the choice among alternatives was made, and the correctness of the choice. The student assignment is to critique the professional performance as described in the case history.

If the case history is intended to serve only as documentation to inform others of project activities and accomplishments, it should follow the format described above except that the detail in professional practice is not desirable. Since the purpose is to describe extension activities, the actions taken and the results achieved are the priority elements. Sufficient detail should be provided to make the case history realistic and interesting.

Case Study

The case study (case problem) for instructional purposes is a situational description. Its purpose is to provide a realistic unstructured problem situation representative of that which the student will face in professional practice.

The greatest benefit from case study instruction is obtained from broad assignments requiring analysis of existing systems (as described in the case study) and recommendations for improvement. In particular, the case study is used to stimulate group discussion of the problem situation, identification of underlying causes, the stated or implied constraints which limit the alternatives for change, the enumeration of alternative solutions, the choice of a best solution, and recommendations for implementation. The instructor should guide such discussion to make certain that important ideas are brought out, that the student approach to analysis and identification of alternatives is correct, and that all appropriate alternatives for improvement are enumerated. However, each student draws upon his own background of knowledge and experience, which is then integrated with that of others until the subject is thoroughly explored. There is very seldom a final, uniquely correct solution to a good case problem.

The usual case study format is to provide a "setting" which places the student in an assumed professional role such as:[1/]

1. A newly hired engineer or manager who has been given the responsibility to correct the problem.
2. A consultant whom the company has hired to analyze the situation and aid in the problem solution.

1/ See the attached case study for an example of the use of a responsibility role for the student.

Note: This case study was given to Mr. Choi, Byoung-Kyu.

Next, considerable background information on the company, its products, and current operating results is given. Such information, in addition to its relevance to the problem, adds realism to the case study. Following this discussion, detailed information, illustrations, and data related to the problem area of interest are provided to enable the student to understand the problem, identify possible causes, enumerate alternative solutions, and formulate recommendations for the best solution. The nature of the information and the amount of detail provided depend upon the problem area for which the case study is to be used. If, for example, the case is to be used for instructional purposes in quality control systems design, detailed information should be presented as follows:

1. A description of the present quality control system (organization, functional responsibilities, personnel, position descriptions, procedures, information flow, equipment, etc.)

2. Quality performance (percent defective, quality costs, quality problems, measurement data, etc.)

3. Purchased material quality control system (procedures, vendor performance, vendor relationships, specific problems, etc.)

4. Factors which relate to quality problems (process descriptions, handling methods, design problems, etc.)

The amount of detail and specific data depends on the assignment for which the case study is intended.

CASE HISTORY OUTLINE

The content of a case history depends upon the purpose for which it will be used. A case history prepared specifically for instructional purposes in business management should have very different content than one intended for use in a plant layout course. A case history intended to document industrial extension activities will be different from either of the above. Because of these necessary differences, it may be misleading to present a case history outline. However, the following is offered as a general guide for the preparation of case histories. It is intended to indicate the proper format and serve as a detailed checklist of information which may be included in the base-line portion of the case history. It is likely that in the preparation of a particular case history some items will be stressed more than others and some will be omitted. No attempt has been made to outline the portion of the case history which presents problem-related information or the portion which describes the problem solution activities and results.

<u>Outline</u>

1. Situation Description (Optional)

   This paragraph is to tell who was involved in the technical service activity and how this activity came to be.

2. Background Information

   2.1 History of the company

   A brief historical account of the company which states what products it produces, when it was founded, by whom, and what has happened to it since it was founded.

   2.2 Organization structure

   A description of the formal organization of the firm which shows how functional activities are organized and the number of persons employed in the various functional departments. If it is important to the purpose of the case history, this section may describe the background of key people in the organization.

   2.3 Market information

   An overview of the market picture. How is the product sold (i.e., salesmen, direct mail advertising, etc.)? What is the geographic area served? How is the product distributed? Who are the purchasers (i.e., consumers, other manufacturers, government)? What are the current market trends and problems?

2.4 The competition

A brief discussion of the amount of competition and the competitive strength of this firm. What are its competitors' strengths and weaknesses? What is the future threat from competition?

2.5 Sales and profit history

A discussion of sales trends and profitability in recent years (or months), with a brief explanation of these trends.

2.6 Problems perceived by management

A discussion of the company's most pressing problems, according to top management, and steps which are now being taken or planned to reduce these problems.

3. Product Information

This section should provide appropriate information related to the product(s) produced by the company. The outline given below is for a case history that is intended to be used for instructional purposes in which product design plays an important role. This section need not be so detailed for other cases.

3.1 Product description and uses (each product)

Although the products made by the company were discussed briefly in Section 2.1, it may be desirable to provide more detail here.

3.2 Product design

This section may be inappropriate for a process-type industry. It is likely to be important for a mechanical industry. Who does the design work? Are drawings and specifications available? Include copies of drawings or sketches if the product design is an important aspect of the case history.

3.3 Product design problems

What are the product design problems which are related to product function? What are the product design problems which are related to production (manufacturing)?

4. Manufacturing Information

This section provides information on inputs to the manufacturing process, the processes themselves, and the production facilities. In brief, it discusses the materials and components used in manufacturing, how the products are manufactured, and the buildings and equipment for manufacturing.

4.1 Purchased materials and components

A description of purchased materials and components, sources, and problems related to these.

4.2 Manufacturing processes

Manufacturing processes are best described by process charts and flow diagrams. However, these must have some detail in order to be useful. It is not sufficient to describe an operation as "machine on lathe." A more complete description of the operation, such as "cut-off and turn 0.3mm radius on ends," is necessary. The equipment used also should be specified. Similar details should be given for moves, inspections, and storages.

4.3 Manufacturing facilities

Manufacturing facilities are best described with a plant layout or sketch. The amount of detail depends upon the importance of manufacturing facilities to the extension services which were provided and the intended instructional use of the case history.

5. Problem-related Information

The content of this section should provide all the details which are relevant to the professional activities performed by SJU faculty so that students will have the necessary information to critique the professional practice. If the case history is to be used as a case problem for instructional purposes, this section should contain the information which the students need in order to identify problems, generate alternatives for improvement, and complete the assigned tasks. If the problem involves a topic which was discussed in some detail in one of the preceding sections, it may be best to expand that section rather than attempt to repeat the previous discussion.

<u>The Industrial Machine Products Company Case</u> (Attachment B)* is a case <u>problem</u> rather than a case <u>history</u> and, therefore, does not conform to this outline. However, it provides an example of the detail which should be provided for problem analysis and solution. (The problem assignment is given on page 10 of the case study.)

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* This case study was given to Mr. Choi, Byoung-Kyu.

6. Professional Assistance Activities and Results

This is a documentation of the professional work of SJU faculty. It should be illustrative of professional practice and attempt to present, in detail, the logical processes used. Solutions which were considered and rejected should be discussed with the reasons for rejection given. Finally, if solutions were implemented, results should be reported.

Sections 2, 3, and 4 have approximately the same content regardless of the instructional purposes of the case history. However, the amount of detail and emphasis may differ according to the intended use of the case history. Section 5 is problem oriented and its content depends on the problem with which the case history is concerned. That section must present sufficient detail to permit the student to recognize problem causes and apply his knowledge to their solution. Section 6 reports the professional assistance activities. If the case history is to be used for instructional purposes, it must be very detailed. If the case history is documentary, much of this detail should be omitted.

INDUSTRIAL ENGINEERING COURSES FOR WHICH CASE STUDIES MAY BE USED

Since many of the courses in the industrial engineering curriculum at SJU are not yet developed, the following list is undoubtedly incomplete.

1. Quality Control

   The quality control course deals primarily with statistical methods in quality control (e.g., control charts, lot-by-lot sampling procedures, continuous sampling, and process analysis techniques.) In order to bring interest and realism to these applications, appropriate problems may be in the form of case problems. More interestingly, the case study can describe the quality problem but omit data and give no indication of which statistical methods should be used. The students can then identify needs for statistical applications, determine which techniques to use and request data from the instructor to actually apply these techniques.

   The case study also may be used to teach quality control systems design. For such use, the case study completely describes the problem situation, including the present quality control system (if any). The student is required to assume the role of a newly hired quality control manager who must identify quality control system needs and design a quality control system for the company.

2. Methods Study, Work Measurement

   Professional industrial engineering practice in methods improvement and work measurement can be taught by the use of detailed case histories. For effective instruction, detailed process charts, motion pictures, and sample parts must be available.

3. Facilities Planning

   A case study, along with product samples, materials, and components, is an excellent approach to teaching facilities planning and plant layout. The case study must include samples and/or drawings of the product and all components. If the course covers only plant layout, process charts showing each move, operation, delay, inspection, and storage in the production of components, subassemblies and final assemblies must be provided. The student assignment is to make an efficient layout of machines and equipment in the present building(s) or, if appropriate, design a complete new plant.

4. Cost Control

   Case studies for teaching cost control may be difficult to obtain -- particularly those which describe an existing cost system which the students can study and critique. Most firms will not disclose their cost data. However, a very good learning experience is to present a case problem situation and ask the students to design an appropriate cost system for the firm. For such an assignment, actual cost data are unnecessary.

5. Production and Inventory Control

   This course is quite commonly taught using case problems.

   Possible student assignments are:

   a) Design the system for production planning, scheduling, and control.
   b) Based upon projected sales during the next three months, develop a complete production schedule.
   c) Determine least-cost inventory policies for raw material and finished goods.

6. Small Business Management

   The case study method has long been used by business schools to teach such courses and has been demonstrated to be very effective.

Appendix 4

CASE HISTORY IN TECHNICAL ASSISTANCE

THE SAM-HO WOODWORKING MACHINE MANUFACTURING COMPANY SEOUL, KOREA

by

SOONG JUN UNIVERSITY
IN COLLABORATION WITH THE
GEORGIA INSTITUTE OF TECHNOLOGY

INTEGRATED DEVELOPMENT CENTER
SOONG JUN UNIVERSITY
SEOUL, KOREA

MAY, 1976

(1) First Contacts

A team of Soong Jun University engineering professors, carrying with them a simple questionnaire, entered the Youngdungpo Machine Industrial Estate in southern Seoul, Korea, in the early part of 1974.

The object was to distribute the questionnaire and see if any companies would reveal problems and seek assistance. There were over 60 small-scale companies in the Estate.

Some companies replied and others did not. The Sam-Ho Woodworking Machine Company was one that did not show any interest at the outset in the offer of our technical assistance.

The engineering professors, however, went ahead and began work with those who were interested. In ensuing weeks, word spread throughout the Estate that something was happening. The owner and operator of Sam-Ho, Mr. Youngho Chae, heard about it. One day, while the SJU engineers were visiting a nearby company, Mr. Chae came over, introduced himself, and invited the SJU team over to his own small machine shop.

(2) Sam-Ho's Problem as Seen by the Owner

Mr. Chae showed his visitors around and explained his operations. The Sam-Ho Company produced single surface planers, jointers, universal circular saws, spindle molders, router machines, knife grinders, and wood lathes.

Very few employees were high-school graduates; most were middle-school graduates. There was one woman doing clerical work. The company was producing about 100 machines in an average month, all custom-made as orders were received.

Mr. Chae explained his problem. Labor costs were going up, as were taxes and raw material costs. National defense needs required all employees to take reserve training at least two days each month. The number of official holidays was up. Official enforcement of the labor act became strict. Competition was getting fiercer daily. All of these factors were causing him to wonder if he was really making any profit. So the problem came out: the owner-manager of Sam-Ho wanted some help in determining actual production costs of each item. He did not know what it really cost to produce.

Mr. Chae explained further his financial status. The accounting system essentially consisted of two pockets -- one, A, for money to be paid out in a short while; the other, B, for incoming funds. As long as B contained a good deal more money than A, all was well. Most of the orders and bills, etc., were kept, not on paper, but in Mr. Chae's head.

During 1969-1971, said Mr. Chae, business had been booming. Housing and high-rise apartment construction in the neighboring area had been so intense that Sam-Ho's entire production was snapped up. Even though many machines quickly failed, Sam-Ho's customers made no complaints. It had been a manufacturer's paradise. Projects rolled in. But, suddenly, construction largely ceased and Mr. Chae's anxieties rapidly set in as marketing shrank up and costs rose.

(3) Problems as Seen by the SJU/Georgia Tech Team

In March, 1974, as the SJU engineers looked at Sam-Ho's operations, it became quickly apparent that certain basic problems had to be solved before product cost analysis could be done. Later in the spring of 1974, when Georgia Tech personnel joined the project, an SJU/GIT joint technical assistance team presented to Mr. Chae their diagnosis and made recommendations which, it was carefully stipulated, would have to be carried out before product cost analysis would even be attempted. Mr. Chae listened to the diagnosis and recommendations and agreed, reluctantly, to the conditions imposed.

(4) Preliminary Observations by SJU/GIT Team

Problem areas identified by observation and questioning were:

1) Lack of inventory control of raw materials and tools. Raw material metal sheeting or steel bars, etc., were scattered about the plant and outside in the yard. Tools were lying around here and there. It seemed that when an order for a certain machine was received, much rummaging around was necessary before needed materials and tools were located. Often, a needed piece was not in stock, and production was held up until it could be purchased.

2) There was no close inspection system for incoming raw materials. Visual observation was about the only checking done; physical testing for hardness, tensile strength, etc. was not done due to lack of testing equipment and skilled personnel.

3) Machines were being manufactured in such a way that nearly every one was a unique creation. There were no blueprints or production drawings with

accurate dimensioning. Individual parts were made and then a machine was assembled by different workers working without standard drawings. Assembly of parts often was possible only by brute force and hammering. Consequently, when a machine broke down, it was also disassembled by force or not at all!

Since standardization of hole locations, diameters, angles, screws, nuts and bolts, etc. was lacking, an extraordinary amount of time was spent in trial-and-error methods of assembly.

4) There was a noticeable lack of good record keeping and accounting.

5) Plant working conditions were poor. Illumination was particularly bad, even on benches or machines where fine work was done.

(5) Recommendations and Actions by SJU/GIT and Sam-Ho in 1974

1) Because of the variety of machines made by Sam-Ho, it was decided to choose only one, a handpress wood planer, and draw up process charts for it. Production drawings were to be made, parts numbered, and employees instructed in reading drawings. This smaller item was to be used as an example to show the prerequisites for a cost analysis as well as the analysis procedure itself.

2) Numbered bins for inventory control of raw materials, parts and tools were recommended. A system of stock numbers was devised. The junkyard-like inventory system was to be eliminated.

3) Sam-Ho was advised to assign a responsible person to take care of tools, jigs, and other equipment.

4) Production drawings of the planer and other products were made. A drawing numbering system was evolved (see the attached). Fundamental principles of clear dimensioning and tolerances were explained to workmen.

5) The use of fixtures and jigs for accurate location and standardization of drilled holes and parts was concretely illustrated by developing a fixture and demonstrating its use (see the attached).

6) SJU/GIT's technical assistance team urged and Sam-Ho adopted a better record-keeping system -- orders, sales records, inventory, etc.

7) Concepts and usage of simple dimensioning and testing calipers and gauges were demonstrated.

(6) Progress in Early 1975

Early in 1975, the SJU/GIT staff was able to see a more orderly and rational system at Sam-Ho. Worldwide economic conditions in this time period being adverse, the company did not expand employment, but production held up fairly well -- an achievement in itself. Product quality and uniformity had improved.

Specifically, Mr. Chae now estimated that machine component part interchangeability had increased from 20% to 80%. Formerly, much production time (about 30%) had been spent in switching parts back and forth to fit together (sometimes forcing the assembly); now only 10% of the total production time was spent so doing. More orderly balancing had been achieved in the production of different parts for a given machine; Mr. Chae felt there had been a 10-20% improvement in balancing his parallel operations.

It should be noted, however, that drawings provided to the company were filed away quietly in his desk drawers and largely ignored. This technology proved to be too high for the educational levels in the plant.

On the other hand, the use of jigs and fixtures had tremendously decreased material loss due to hand finishing. Records began to be kept and inventory brought under control. It began to be possible to follow a machine through the various stages of production to get times needed for cost analysis. Mr. Chae now came to understand the conditions of production processes under which his original problem -- cost analysis -- could be solved. Consequently, the SJU/GIT team felt that the project had proven worthwhile, witnessing so many improvements since Mr. Chae had received its joint technical assistance.

(7) Owner Chae Visits Georgia Small-Scale Industry in Summer, 1975

Mr. Chae had visited Indonesia many years ago on a market research tour. Since two Soong Jun faculty members were scheduled to visit Georgia Tech's Industrial Development Division (now Economic Development Laboratory), the idea occurred to him to accompany them and observe similar industry in Georgia.

Paying all his own expenses, Mr. Chae did go to Georgia and, with the guidance of Georgia Tech team, visited numerous small-scale machine plants. He accompanied a Soong Jun University mechanical engineer who, along with Georgia Tech people, pointed out production methods, procedures, plant layouts, inventory systems, etc. in U. S. plants, about which Mr. Chae had been told but which he had not seen in action. This visit to the United States made a big impression.

(7) Post-U. S.-Visit Changes at Sam-Ho

While in the United States, Mr. Chae saw the extensive use of measuring and dimensioning instruments and purchased several thousand dollars worth of high-grade gauges upon his return to his plant. He also had seen in each plant he visited that there were certain basic machine tools. He decided to purchase similar basic items for Sam-Ho and about $100,000 was spent for these major acquisitions in 1975.

He also observed the extensive use of professional production drawings, accurately dimensioned with tolerances, and so he felt the need of raising the educational level of employees.

Plans were made for expansion of the plant, using new purchased machine tools, since economic conditions in Korea were improving.

(8) Results of SJU/GIT Assistance as of May, 1976

Visits by SJU/GIT personnel continued in spring, 1976. Although Mr. Chae's original requests for detailed cost analysis on all his products had not been met, progress in this direction and other matters was evident.

1) Plans for plant expansion were being made. Installation of newly acquired machine tools required fresh thinking on matters of plant layout and production processes. This kind of task will involve an SJU industrial engineer, first faculty in SJU's new Industrial Engineering Department, granted to SJU by the Korean Ministry of Education and planned with Georgia Tech's assistance.

2) Production had increased from about 100 units per month to about 130.

3) Stock bins for inventory and parts and use of stock numbers had brought some order and efficiency into a formerly chaotic situation.

4) More uniform or standard machines were being produced as a result of the use of various jigs and fixtures. Time wasted in custom-assembling each machine was largely eliminated.

5) A full set of testing and measurement devices had been purchased for inspection of incoming raw materials and work in progress. Machine quality had

improved greatly. This made possible an export of some $80,000 worth of machines to Australia in 1975.

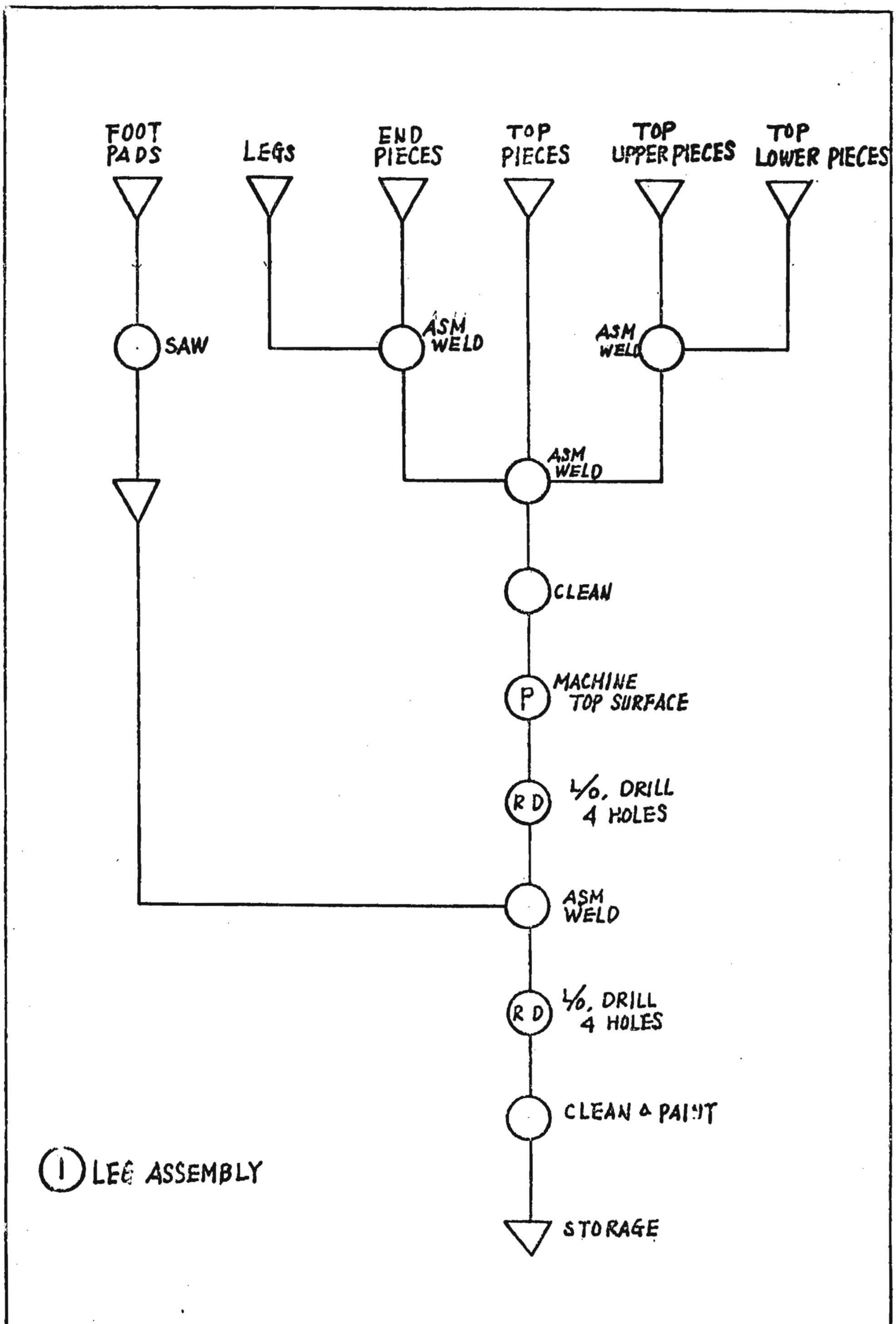
6) The educational level of employees was raised. Owner Chae had employed three young college graduate engineers, five graduates of technical high schools, and five other employees. With this support, plans were made to institute an in-plant training program.

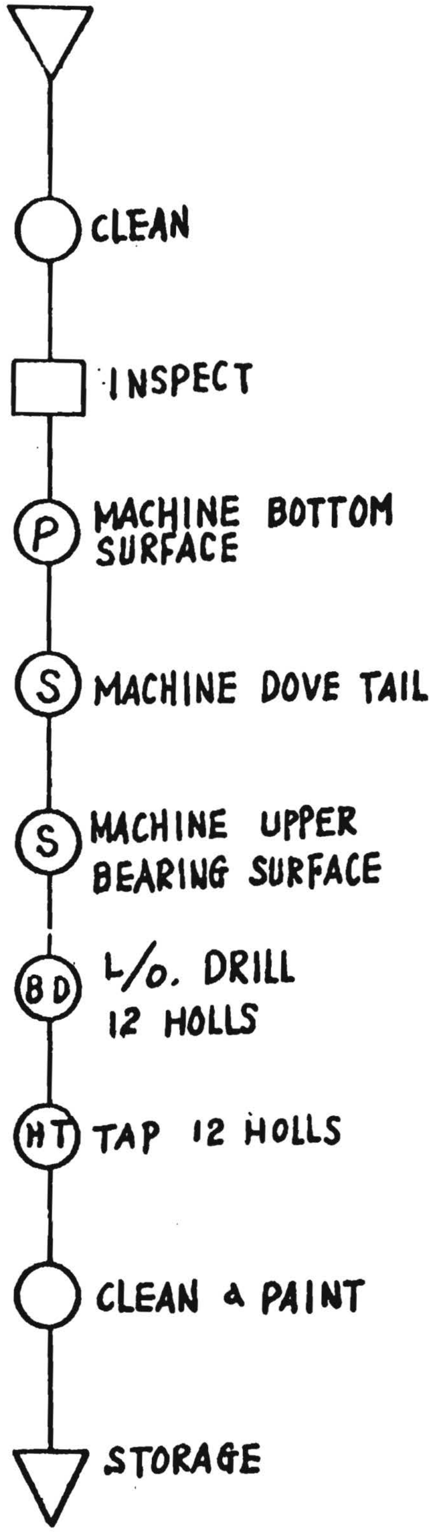
7) Sam-Ho was projecting a need for employment of about 50 additional persons as a result of plant expansion -- a doubling of the original work force.

(9) Future Assistance at Sam-Ho

Good results have been achieved at Sam-Ho and owner Chae is pleased with his relationship with the SJU/GIT technical assistance project.

Largeness brings its new challenges, and Mr. Chae has begun to meet difficulty in controlling all aspects of his operations, which he could do formerly. At this point, the SJU/GIT teams feels Mr. Chae is facing the difficult matter of delegation of responsibility and authority. Mr. Chae is considering the kind and number of additional managers needed. He thus is looking to Soong Jun for guidance in the management area. The transition from a one-man operation to a larger management system, with delegation of authority and mutual trust, may be an anxiety-producing experience for Mr. Chae.


FOOT PADS
LEGS
END PIECES
TOP PIECES
TOP UPPER PIECES
TOP LOWER PIECES
SAW
ASM WELD
ASM WELD
ASM WELD
CLEAN
MACHINE TOP SURFACE
P
RD
L/O, DRILL 4 HOLES
ASM WELD
RD
L/O, DRILL 4 HOLES
CLEAN & PAINT
STORAGE
1 LEG ASSEMBLY


CLEAN
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MACHINE BOTTOM SURFACE
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L/O. DRILL 12 HOLLS
HT
TAP 12 HOLLS
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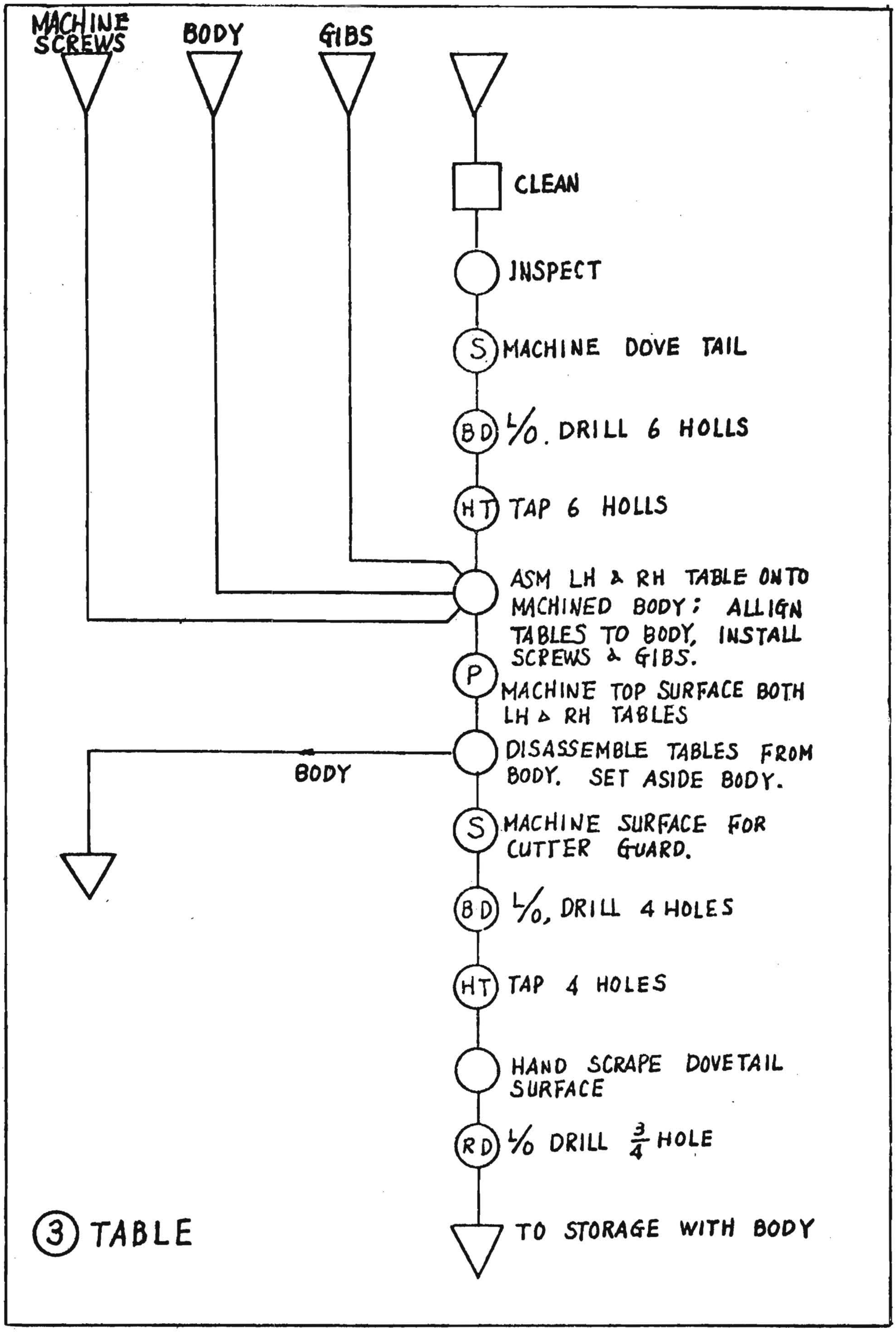
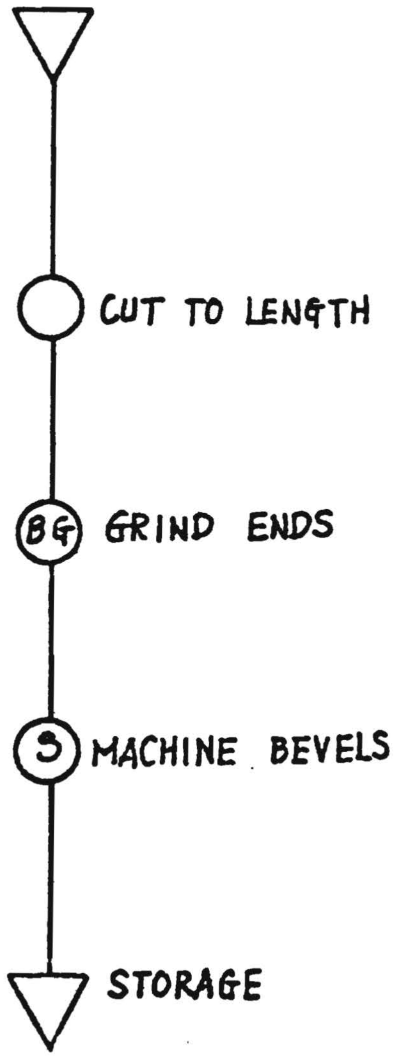
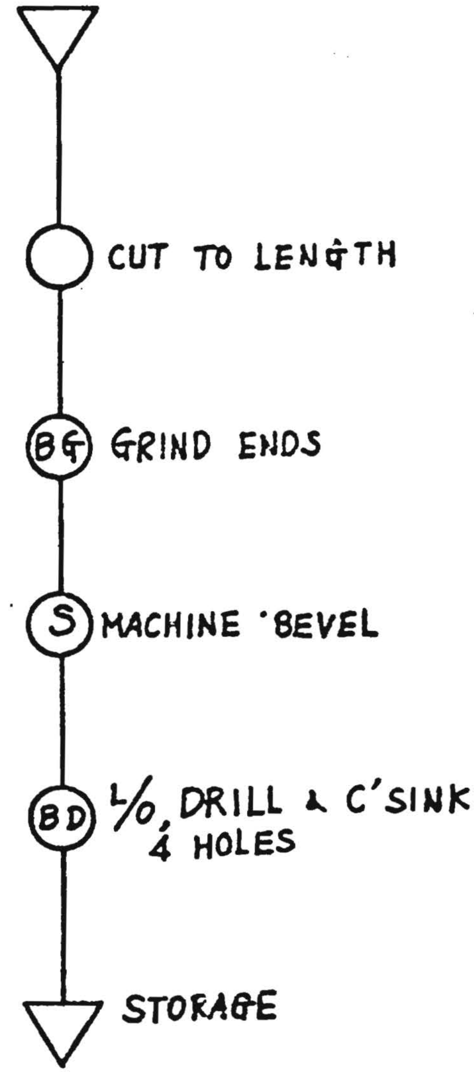
STORAGE

② BODY

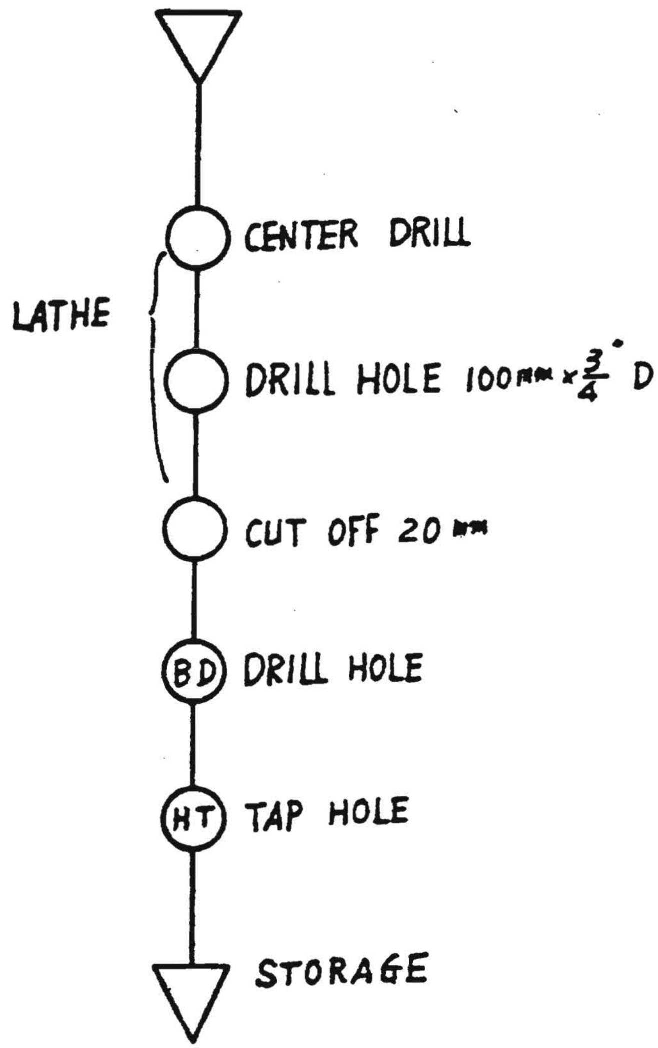

MACHINE SCREWS
BODY
GIBS
CLEAN
INSPECT
S MACHINE DOVE TAIL
BD L/O. DRILL 6 HOLLS
HT TAP 6 HOLLS
ASM LH & RH TABLE ONTO MACHINED BODY; ALLIGN TABLES TO BODY, INSTALL SCREWS & GIBS.
P MACHINE TOP SURFACE BOTH LH & RH TABLES
DISASSEMBLE TABLES FROM BODY. SET ASIDE BODY.
BODY
S MACHINE SURFACE FOR CUTTER GUARD.
BD L/O, DRILL 4 HOLES
HT TAP 4 HOLES
HAND SCRAPE DOVETAIL SURFACE
RD L/O DRILL 3/4 HOLE
TO STORAGE WITH BODY
3 TABLE



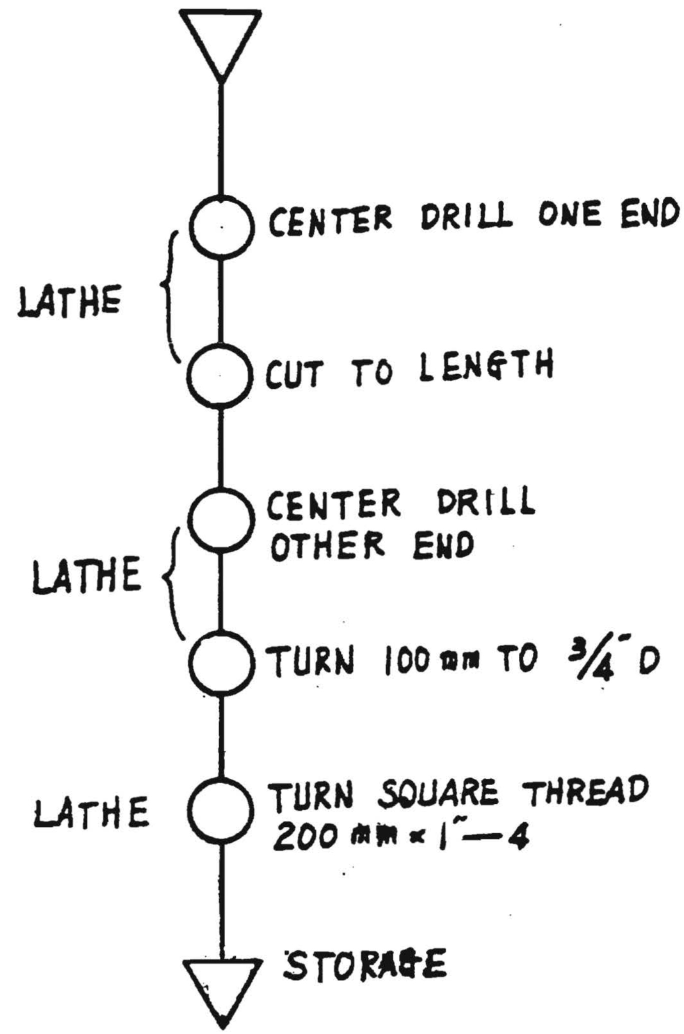
5 GIB



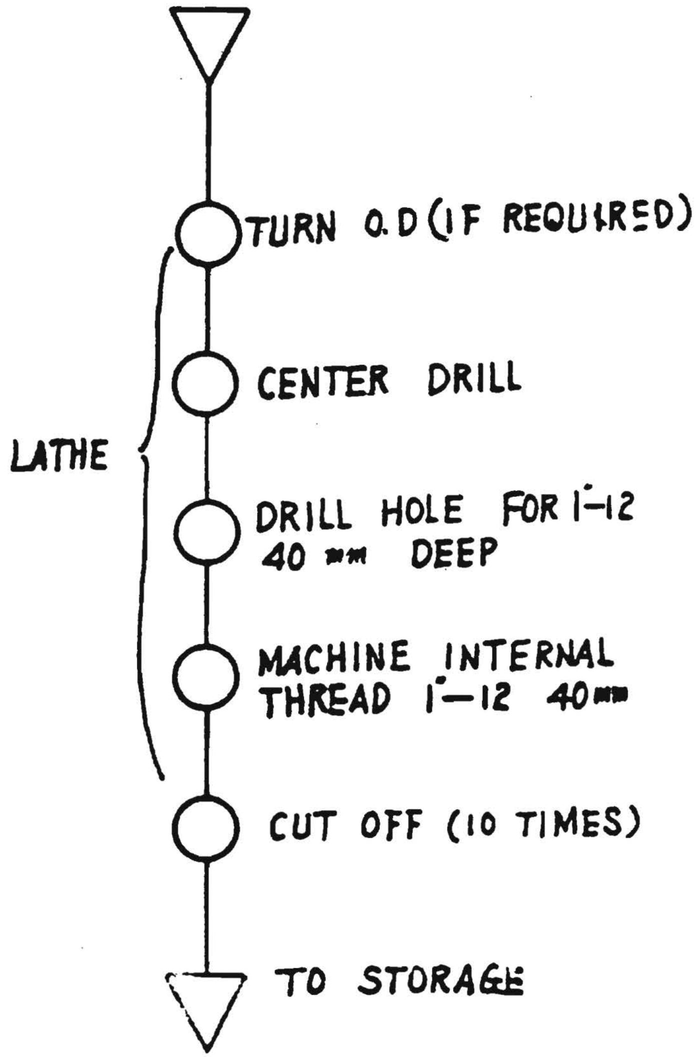
4 CUTTER GUARD



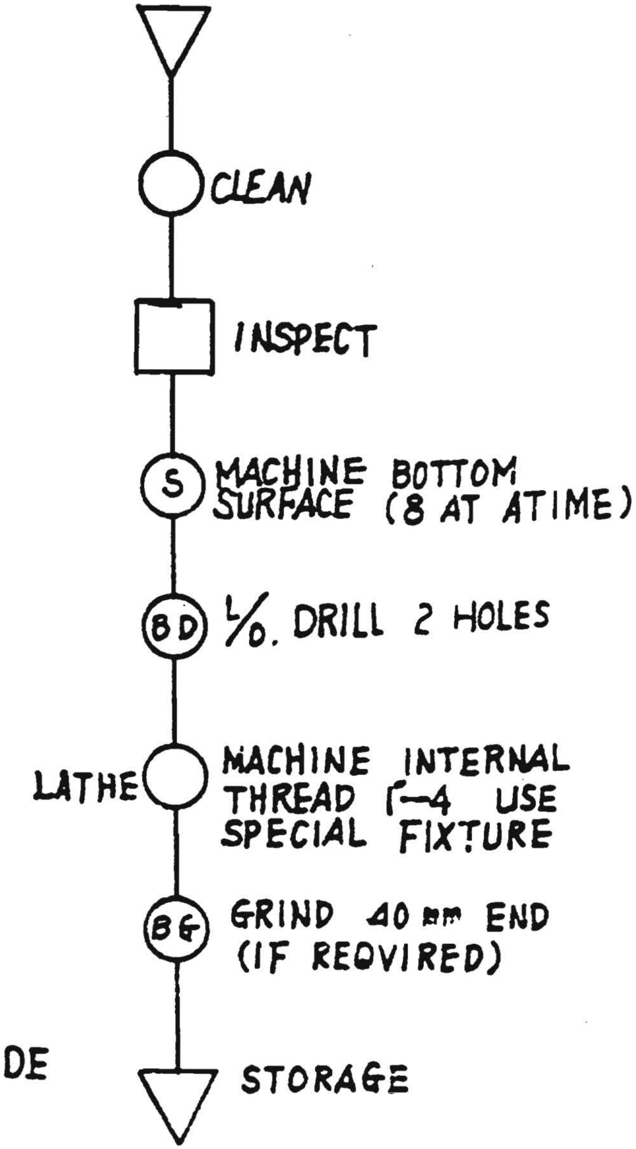
7 COLLAR



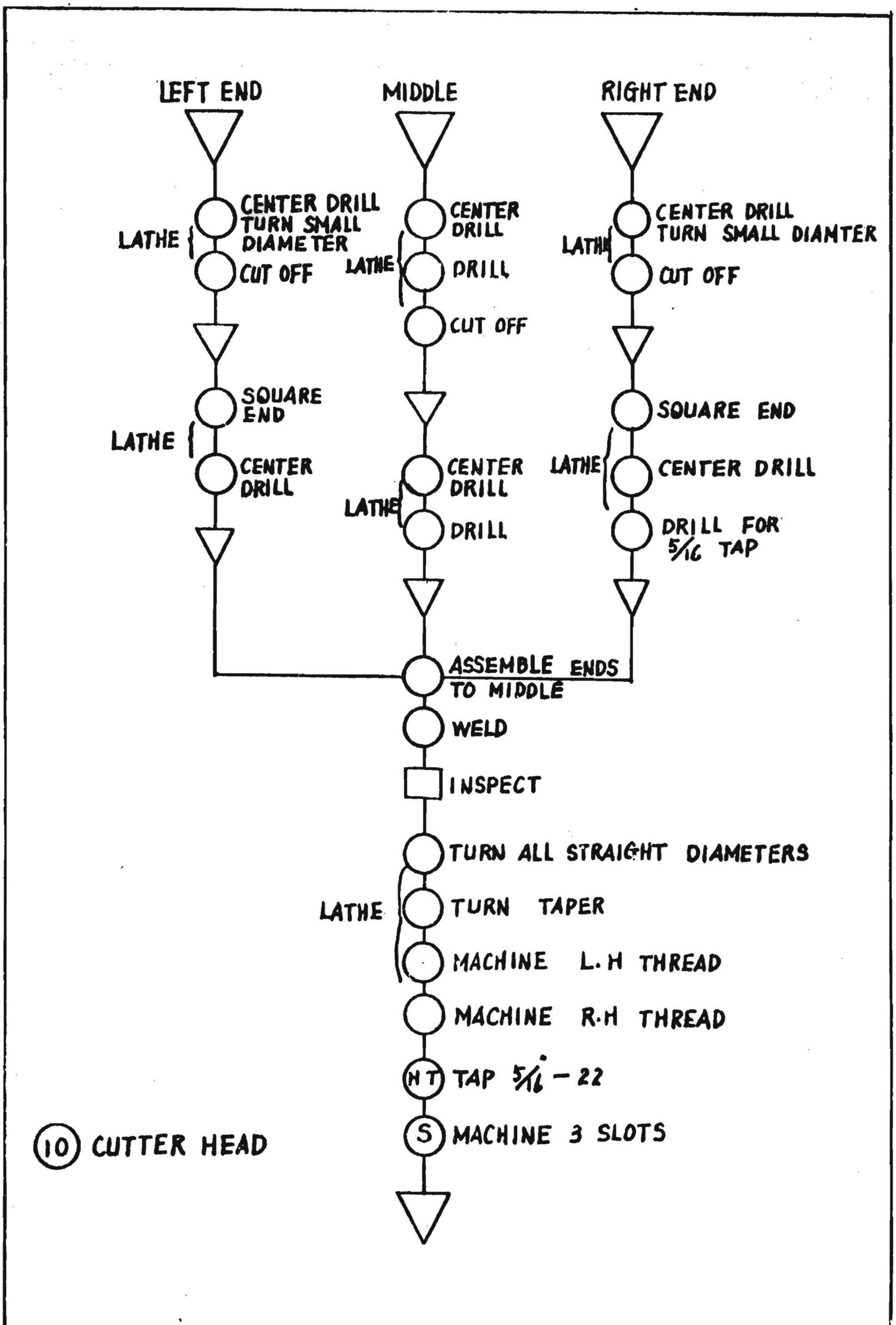
6 SHAFT

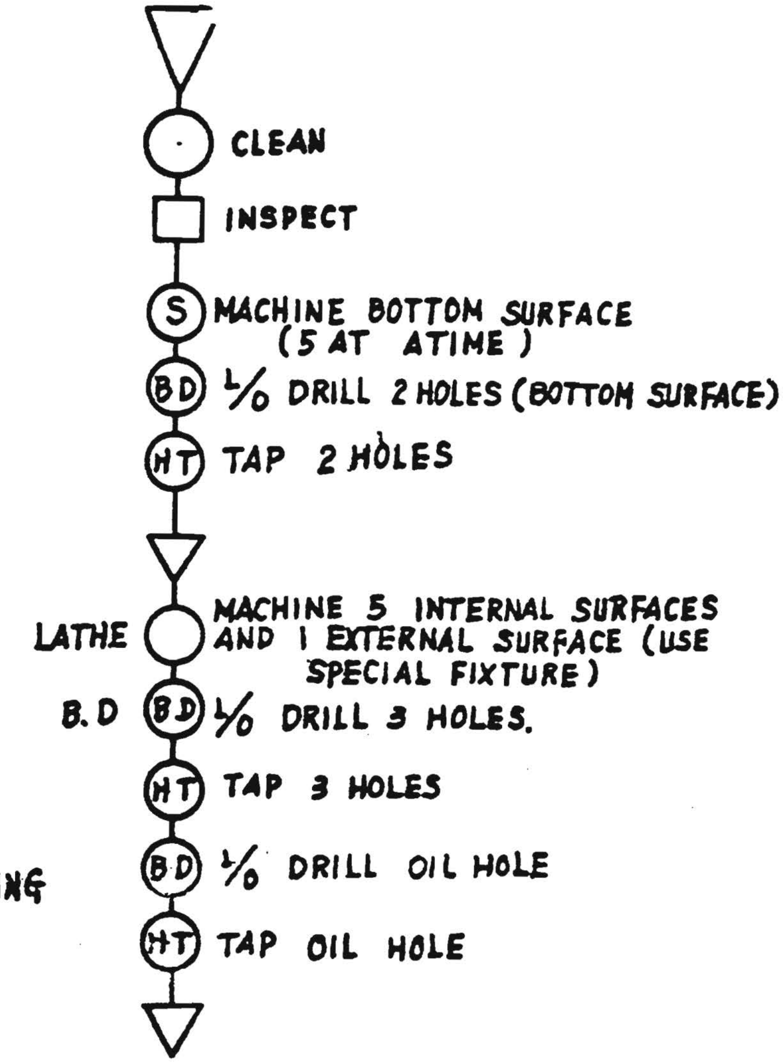


(11) BEARING RETAINER NUT

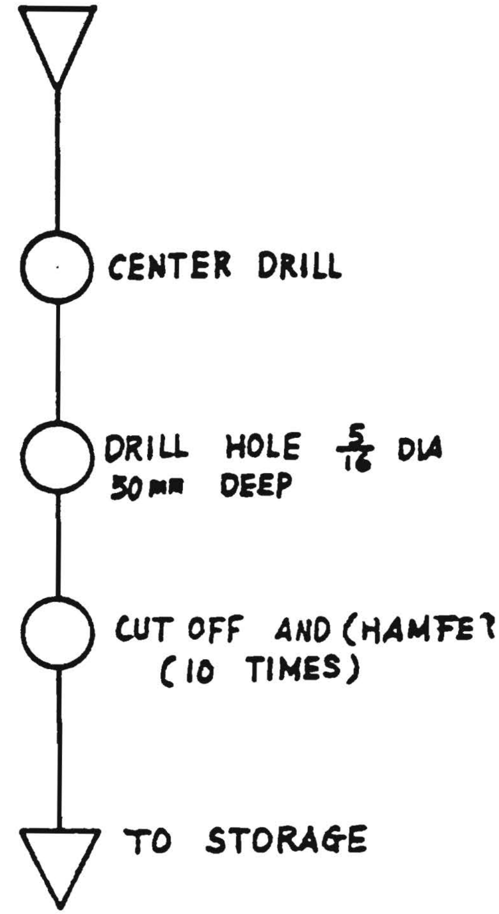


(8) GUIDE

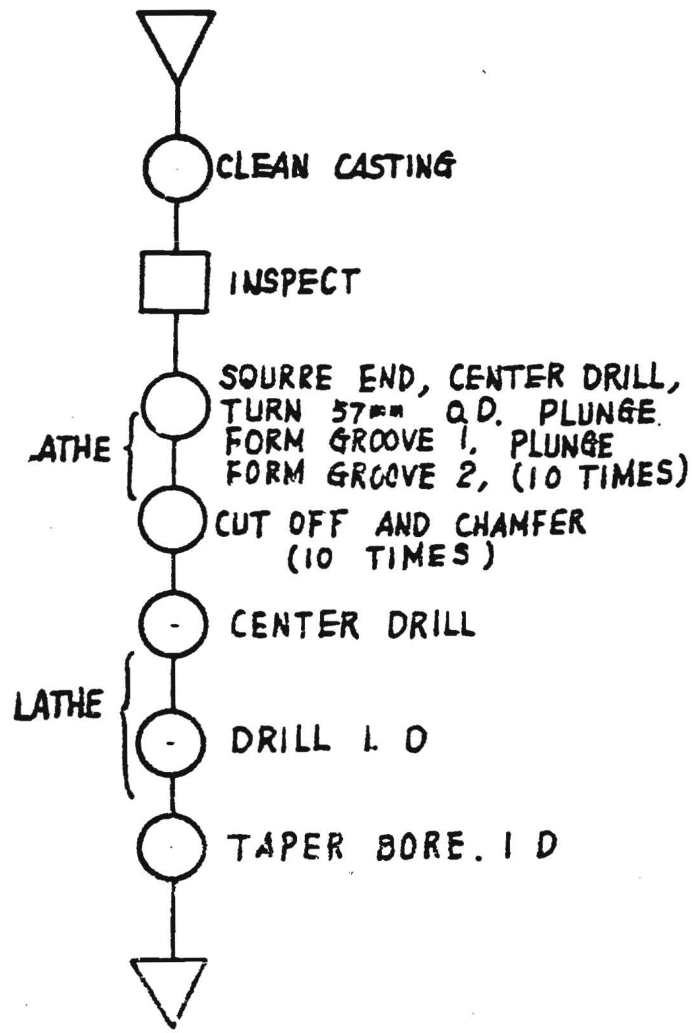

LEFT END
MIDDLE
RIGHT END
CENTER DRILL
TURN SMALL
DIAMETER
LATHE
CUT OFF
CENTER
DRILL
LATHE
DRILL
CUT OFF
CENTER DRILL
TURN SMALL DIAMTER
LATHE
CUT OFF
SQUARE
END
LATHE
CENTER
DRILL
CENTER
DRILL
LATHE
DRILL
SQUARE END
LATHE
CENTER DRILL
DRILL FOR
5/16 TAP
ASSEMBLE ENDS
TO MIDDLE
WELD
INSPECT
TURN ALL STRAIGHT DIAMETERS
LATHE
TURN TAPER
MACHINE L.H THREAD
MACHINE R.H THREAD
HT
TAP 5/16 - 22
S
MACHINE 3 SLOTS
10
CUTTER HEAD



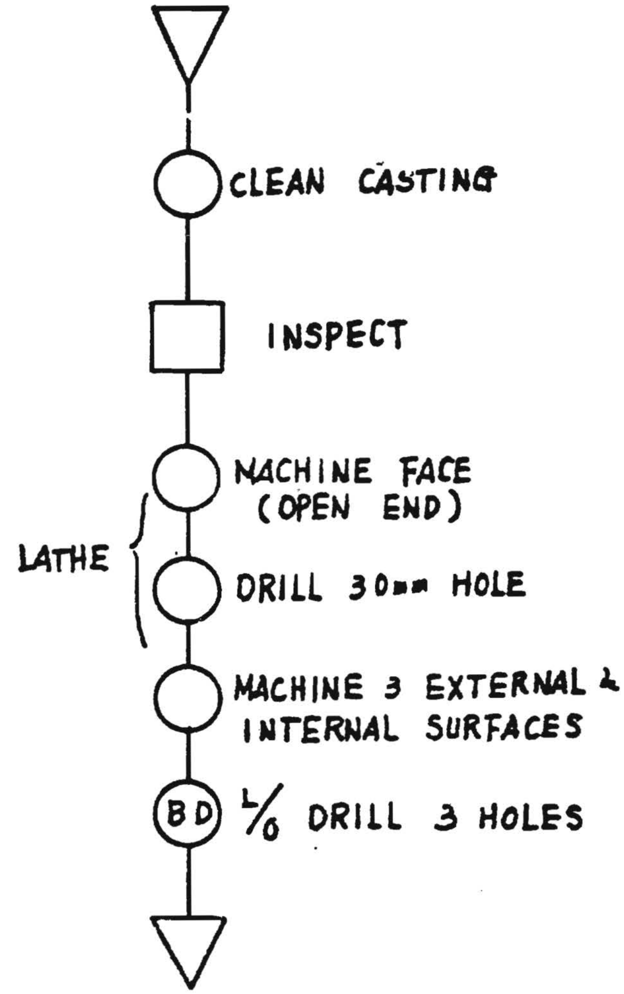
13 BEARING CASE



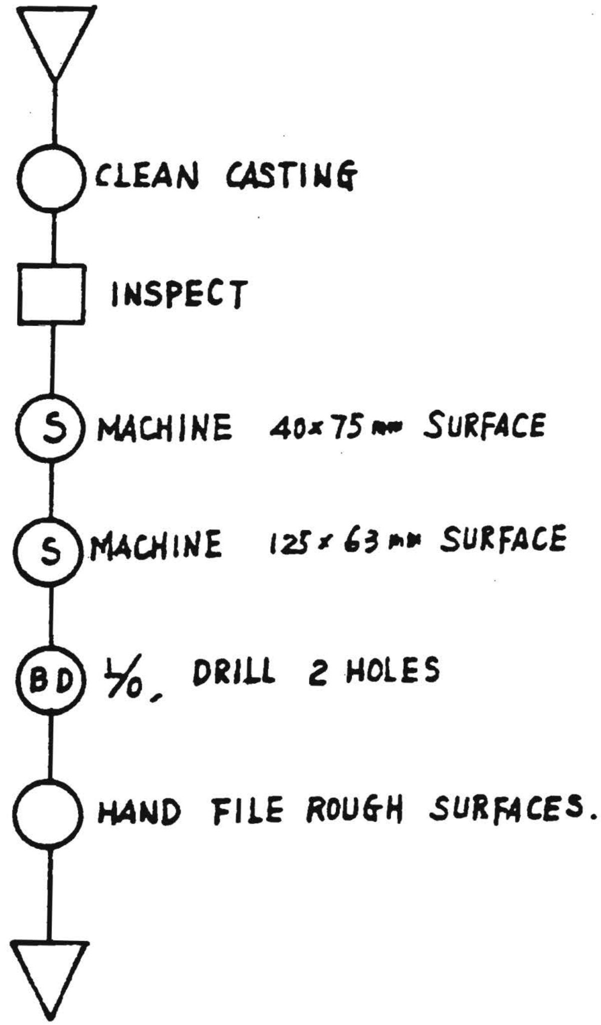
12 RETAINING WASHER



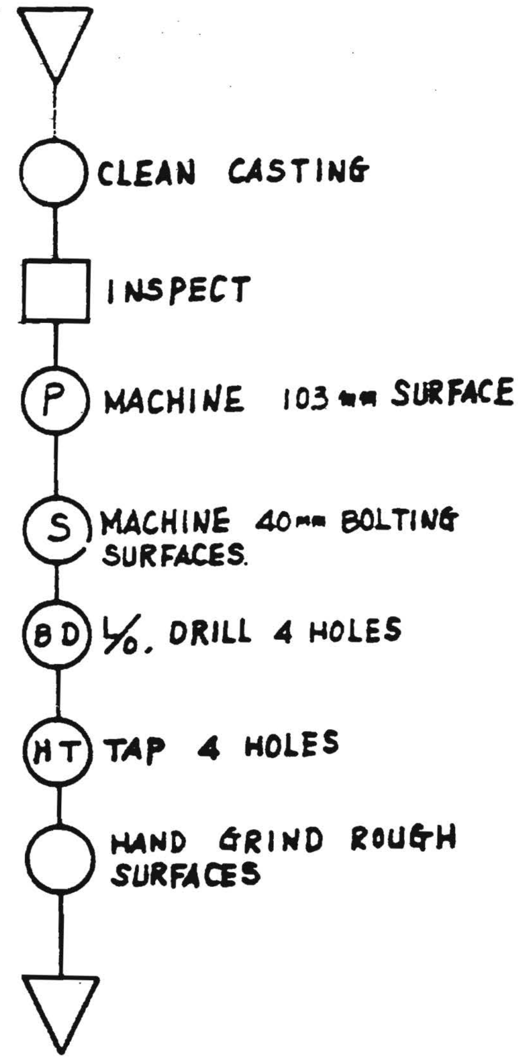
15 AXLE PULLY



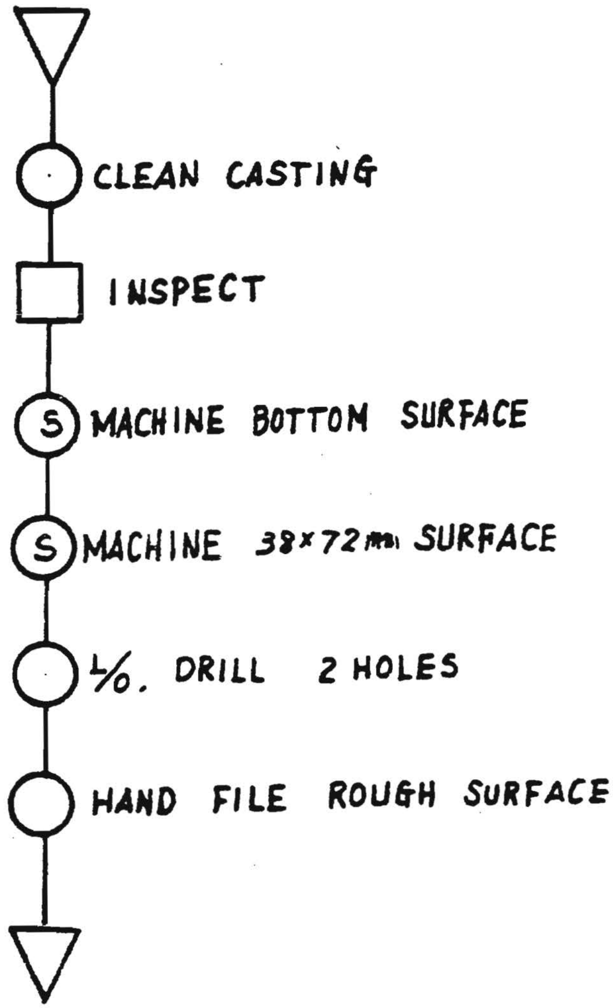
14 BEARING CASE COVER



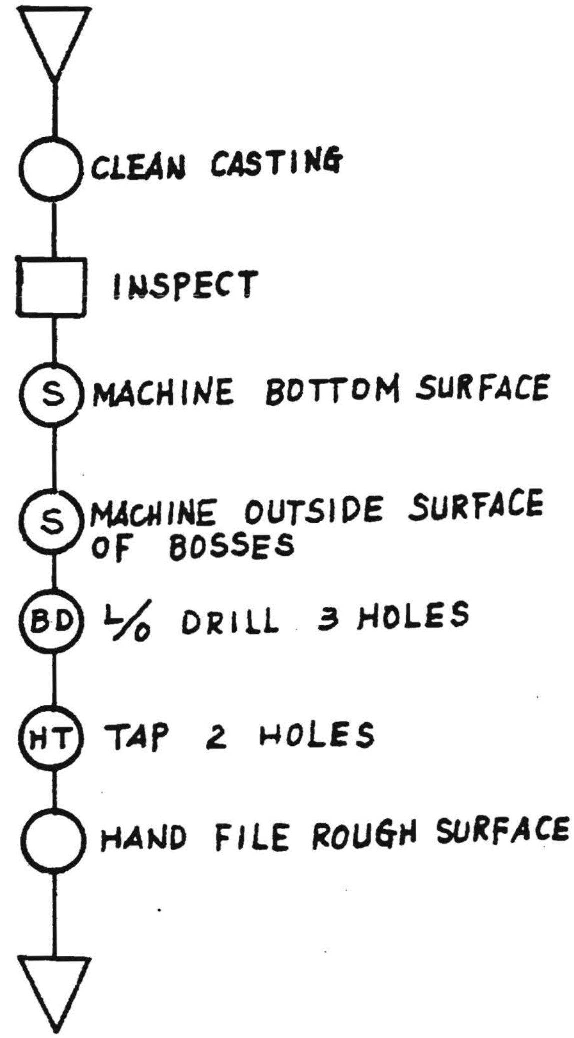
(17) FIXED SQUARE ARM



(16) ADJUSTABLE SQUARE ARM

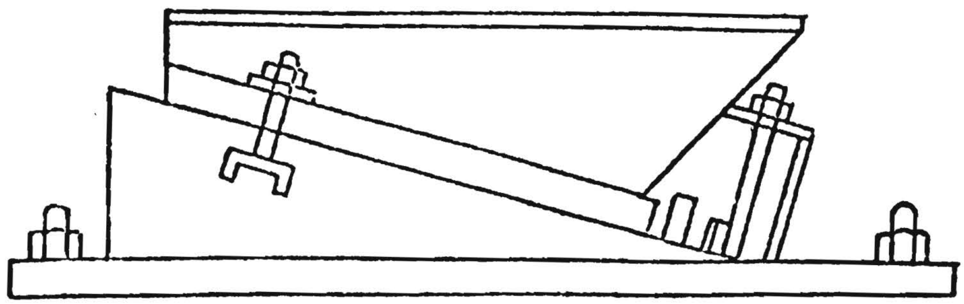


19 FIXED HORIZONTAL SQUARING ARM CONTROL

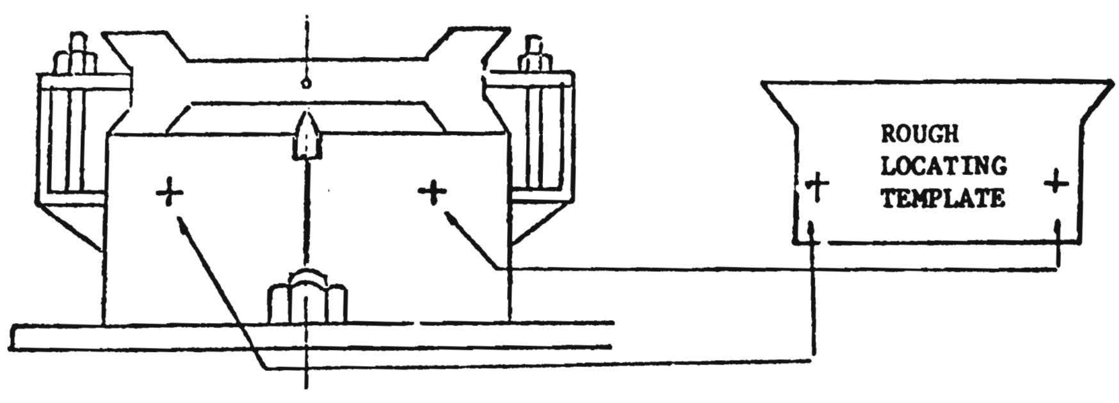


18 ADJUSTABLE HORIZONTAL SQUARING ARM CONTROL

FIXTURE DEVELOPED BY SJU STAFF FOR
SAM-HO MACHINE INDUSTRIES COMPANY, KOREA



1. Locate raw casting on slant top fixture. 520 x 280 is first reference surface.
2. Machine 355 x 325 surface.
3. Locate and on boss by using 230 dimension.
   Locate center of boss by reference 355 x 325 surface.
   Punch center. Outer surface of boss is reference surface; punch mark is other reference point.



4. Locate casting on slant top fixture. Slide punch mark to stop. Use 230 dimension to align. Machine male dovetail surfaces.
5. Locate casting on slant top fixture. Slide mail dovetail into dovetail fixture. Machine female dovetail surfaces.
6. Locate casting on drill fixture using mail dovetail as clamping surface. Drill 20 mm hole.

Appendix 5

LOW-COST TENSILE STRENGTH TESTER
AND
IMMERSION PYROMETER

by

SOONG JUN UNIVERSITY
IN COLLABORATION WITH THE
GEORGIA INSTITUTE OF TECHNOLOGY

INTEGRATED DEVELOPMENT CENTER
SOONG JUN UNIVERSITY
SEOUL, KOREA

JUNE, 1976

Adaptive Technology

(1) Basic Concept

When technical problems are encountered in small-scale industries, techniques and solutions that are commonplace in large-scale industries very often cannot be used. The most common reason for this is lack of funds to purchase ready-made tools and machinery and lack of skills and training necessary to implement solutions requiring advanced technology. In small-scale industry, the solutions to problems must be compatible with available skills and funds.

Technical assistance personnel consisting of engineering faculty from Soong Jun University and engineering staff from Georgia Tech made several contributions during 1974-1975 to Korean small-scale industry in adaptive technology.

(2) An Inexpensive Tensile-Strength Tester

In the Youngdungpo Machine Industrial Estate are several foundries which produce grey iron sand castings. Customers of these foundries order castings which are required to have certain strength requirements. In order to test the strength of cast iron accurately, very expensive testing equipment is required which these small foundries cannot afford to buy.

The usual results of this lack of test equipment are that the customer's specifications are exceeded, thereby losing profit for the foundry and wasting valuable high-strength material, or that the customer's specifications are not met, causing him either to reject the castings or to experience casting failure because of low strength.

The Mechanical Engineering Laboratory at Soong Jun University has a tensile tester of high quality which cost about $12,000. Keeping in mind the above two constraints -- lack of funds and lack of skilled testing operators, the SJU/GIT technical assistance team designed and manufactured a prototype tensile tester sufficiently precise for a foundry's need, yet not complicated or expensive.

Essentially the tester operates as a 2nd-degree mechanical lever in which the load, which is a specimen iron bar to be pulled apart, is located between a hinged fulcrum and the applied force, which is a 25 KG weight hung from the bar, movable along the bar much like a common weight scale. The tester was calibrated using as a standard reference the professional tensile tester in SJU's laboratory.

As is common in engineering, the simple design went through several iterations. The first one (see Appendix 1) proved difficult to move the weight by hand along the lever bar and so a worm screw was added (see Appendix 2). Further testing then showed that when the specimen finally was pulled apart, the lever arm collapsed with its heavy weight with a large force. Therefore, springs were placed below the weight as shock absorbers. Finally, the whole steel assembly proved heavy to move around so that a wheeled-carriage was added.

Cost now reaches about $300, about 1/40th the cost of SJC's laboratory tester.

(3) A Simple High-Temperature Thermocouple

The SJU/GIT technical assistance team, observing the various foundry and other metalworking small-scale plants in the same Estate, noticed that product quality was probably being adversely affected by lack of temperature control over melts in process. Temperatures of molten metals were determined largely by sight or color, in truth not an uncommon method but one which lacks sufficient precision for many applications.

Since D'Arsonval meter movements, the basic component of inexpensive volt-ohm-ammeters, are readily available on the Korean market, a Georgia Tech engineer brought from the United States some chromel-alumel wires. He devised a simple thermocouple-ammeter arrangement, where the DC voltage generated at the Ch-Al junction is proportional to the temperature (Ch-Al has a high coefficient of thermal e.m.f., which makes the less-sensitive (inexpensive) meter movements useable).

The calibration of this simple thermometer was done by comparison with readings given by a commercial thermocouple brought from the United States by the Georgia Tech engineer.

The cost of the Korean-made thermometer is about $20, as against the commercial instrument's cost of about $100.

(4) Application Difficulties

By summer, 1976, use of the tensile strength tester at a company has been suspended due to the company's moving to a distant location. However, other small foundries in the Estate have shown interest in the device.

The SJU/GIT team feels that eventually the tester will be widely used.

A belt and handbag manufacturing company, which is also one of the industries in the Estate, has at any moment numerous melts of different alloys in process, all demanding temperature monitoring. These are small metals, yielding small quantities of metal having different colors and other physical properties to make multitudinous kinds of belt buckles and other metal attachments.

Use of the thermocouple thermometer has met with some resistance by the employee, who by long experience has built up his skill in recognizing temperature by color. This person is an older man whom the owner-manager does not wish to offend - a Korean cultural aspect.

However, the owner feels that in time, the employee will begin to see the convenience and other advantages of the simple thermometer and is proceeding with plans to make several gauges.

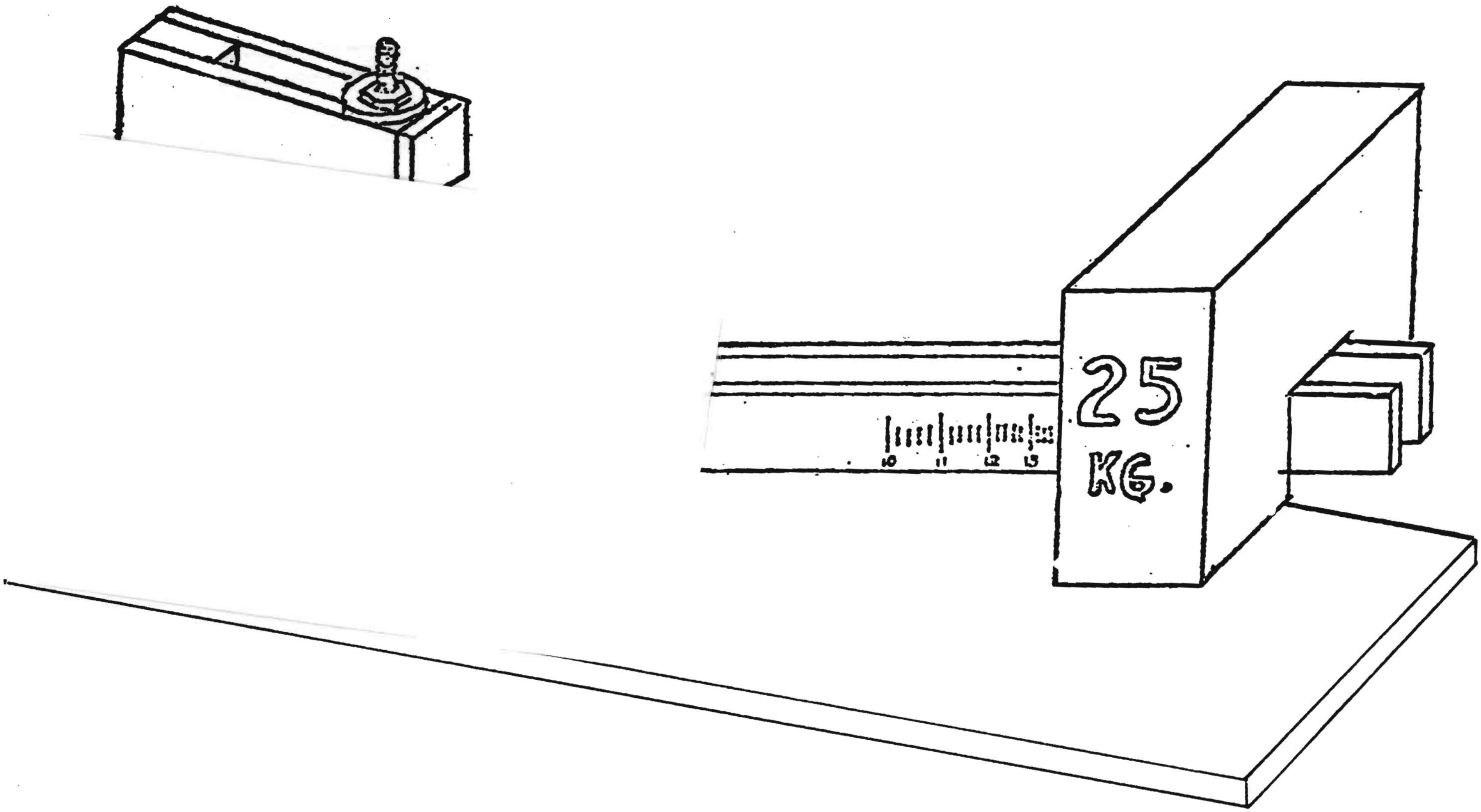
(5) Adaptive Technology Principle

In both the cases above, the underlying principle is that by using precise university lab instruments as reference standards for calibration purposes, technicians can make inexpensive devices, sufficiently precise to raise the quality of small-scale industry products in developing countries significantly.

This constitutes an important contribution to Korean small-scale plants and opens new vistas for use of precise university laboratory equipment.

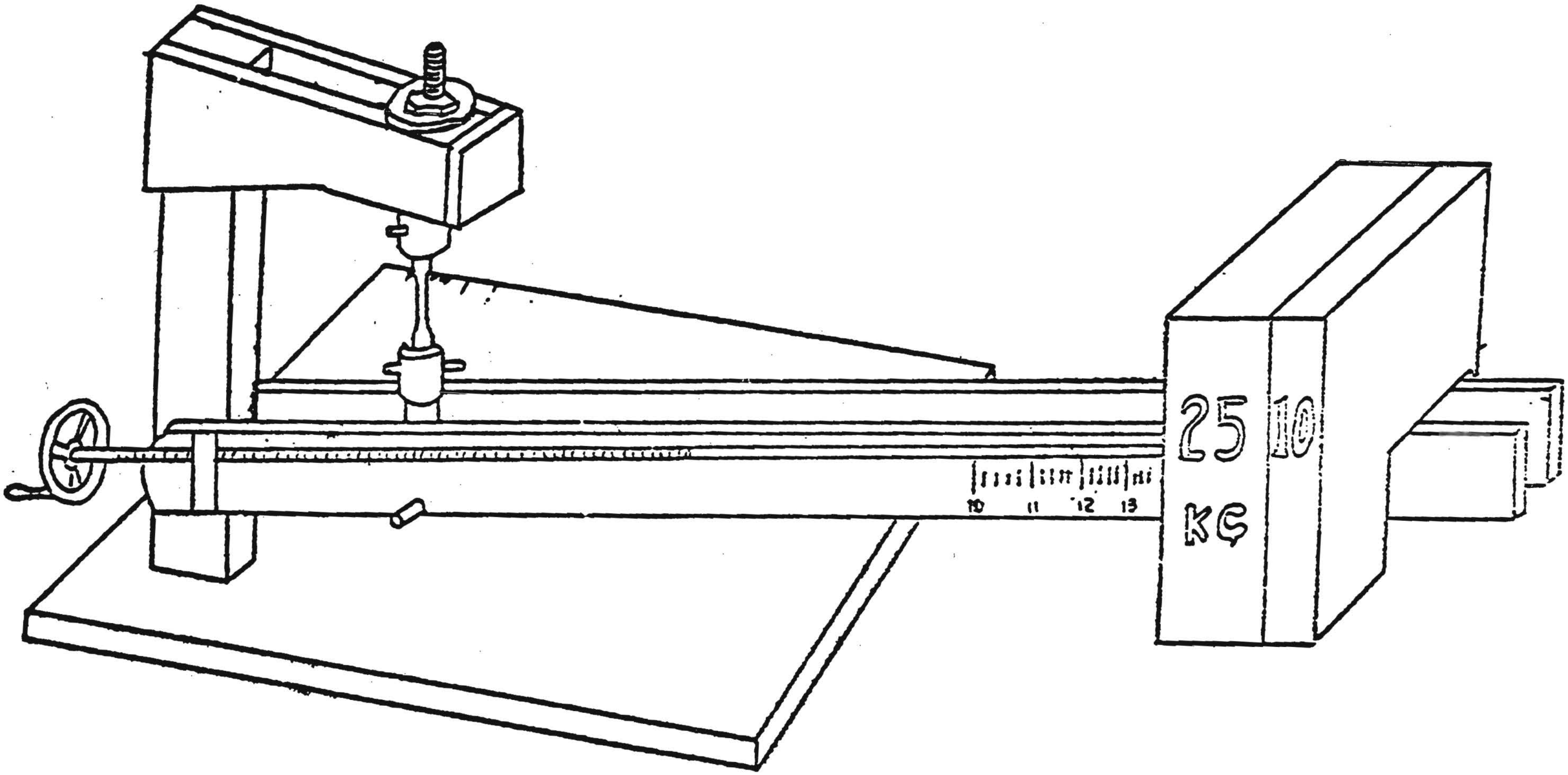
Perfect measurements are not the objective nor would such equipment be useful since so many other production variables have not yet been brought under control. But statistically important improvements can be made anyway, and cheaply.

Appendix 1



CAST IRON TENSILE TESTER - CONCEPT

Appendix 2



CAST IRON TENSILE TESTER - CONCEPT

Appendix 6

SAM-SHIN SEWING MACHINE COMPANY

A Case History
of
Industrial Extension Services

Prepared by
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October 1976

Soong Jun University
Seoul, Korea

I. Introduction

Sam Shin Sewing Machine Co. is located in Youngdong-Po Machinery Industrial Estate, which is composed of about 60 small companies. During the summer vacation in 1974, Soong Jun University had prepared a short-term training program (three weeks) especially for the machinists and middle managers in the Estate, and one of the trainees from Sam Shin asked for technical services from SJU. Upon their request, Prof. Yoon and Prof. Lim, both mechanical engineers, started extension work for this company in 1975. However, the extension work became more intensified and diversified from early 1976 onward, when Mr. Choi, an industrial engineer, and Mr. Kim, a mechanical engineer, joined the extension service.

II. Background of the Company

Sam Shin produces mainly one type of domestic sewing machine (Model 15K) and sometimes an industrial sewing machine (Model 103K). This company was founded formally in 1966 by Mr. Lee, who is the present president, as a sewing machine manufacturer. However, at the beginning this company was mainly engaged in assembling of sewing machines with partial machining of minor parts. In 1969 it purchased a set of facilities for arm and bed (of sewing machines) machining, which made this company a sewing machine manufacturer in fact as well as in name.

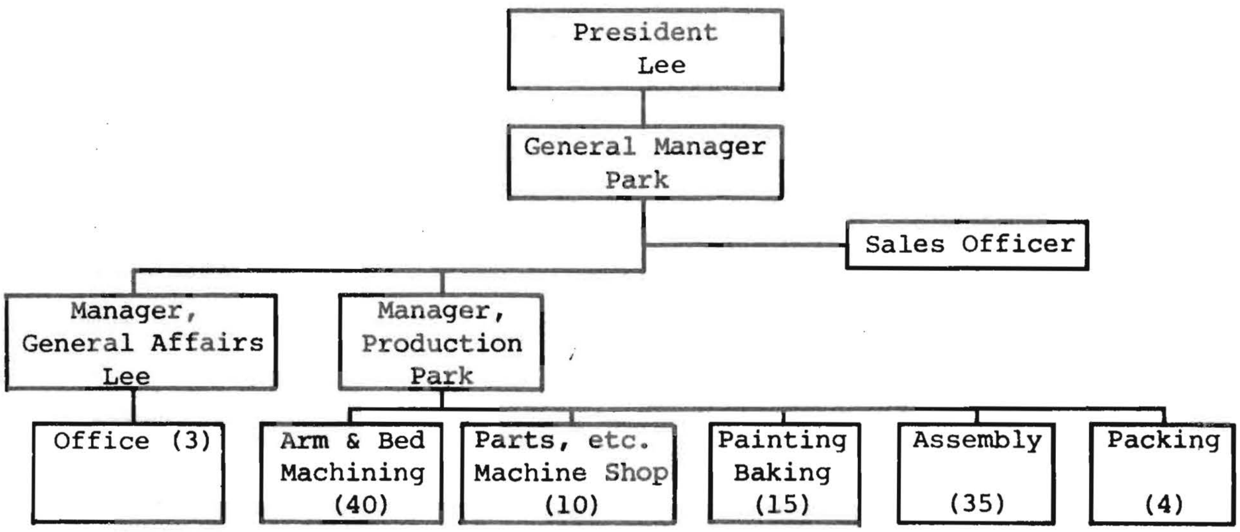
After this expansion, this company moved to the Estate from its original site, Daebang dong (another Youngdong Po area) in 1970. Up to the end of 1971 it was able to maintain its sales volume at about 2,500 units a month in spite of the growing competition and unstable domestic market. From early 1972, however, its sales began to be cut down seriously as a result of the economic depression in Korea, and to make things worse, the "8.3 Measure," which was a government regulation prohibiting private loans, made this company shut down from mid-1972, owing to the paralyzed financing.

After this difficult period, the company found a means of survival by initiating exports to Japan in 1973, and it did a good job in 1974. At this time this company sold the domestic sewing machine, which was the only product it produced, only to Japan. They introduced a type of industrial sewing machine (Model 103K) for the domestic market in February 1975, which made it possible to survive when exporting was completely blocked in late 1975.

Fortunately, orders from Japan and Iran have been increasing since early 1976, and now (September 1976) this company is unable to keep up with its total orders even with its increased manpower (currently 95 production workers) and with extended working hours (sometimes 12 hours a day). It is now producing about 6,000 sewing machines a month, working at maximum capacity.

III. Organization Structure

As can be seen in most small companies in Korea, this company has no formal organization as far as the functional activities are concerned. All the managers are carrying out their jobs somewhat interchangeably, although they have their main responsibilities or duties in its organization structure. However, its functional activities can be depicted as follows:



Background of Managers

1) Mr. Lee, President, has a considerable amount of experience in production as well as in sales of sewing machines. Now in his middle fifties, he spends most of his time in the factory and makes frequent trips to Japan. He seems to have a good relationship with Japanese buyers and even with domestic competitors.

2) Mr. Park, General Manager, had been working for a small trading company for about three years before he moved to this company in 1974. He was originally a schoolteacher.

2) Mr. Lee, Manager of General Affairs, graduated from a mercantile marine college and then became a sailor. He is a close relative of the

president of this company and joined it last year (1975). Although he has little experience in this type of business, he has an earnest character.

4) Mr. Park, Manager of Production, is an industrial high school graduate and has been working in this company for a long time (about six years). He is mainly responsible for the arm and bed machining as well as general production management.

IV. Market and Sales

4-1 Market Information.

This company has no domestic market. It receives sales orders from Japan (Model 15K and Model 103K) and from Iran (Model 15K), mainly through a big trading company. However, this company has a very close and direct relationship with the Japanese buyers; moreover, it receives some technical assistance and information from a company in Japan. Recently orders have been rising so rapidly that this company has had to cancel some of the L/C, and it is generally believed that this trend will continue for a while. But the price of sewing machines in the export market is too low to make a satisfactory profit.

4-2 The Competition.

There are two big companies and about six small companies in the sewing machine industry in Korea. Among them, the two big companies are not so interested in the Japanese market because of the tight margin, and this company has the exclusive position among these small companies as far as the Japanese market is concerned. Currently, this company does not feel any threat from competition.

4-3 Sales and Profit History.

The domestic market is shared almost wholly by the two big companies because of their strong sales forces and name values. After giving up domestic sales and starting export in 1973, this company was able to sell a small volume of industrial sewing machines in the domestic market only in 1975.

Following is the sales history of this company.

Year (Month)	Export	Domestic	Total
1973	$ 80,000	-	$ 80,000
1974	200,000	-	200,000
1975	40,000	60,000*	100,000
1	-	-	-
2	8,000	-	8,000
3	20,000	-	20,000
4	30,000	-	30,000
5	50,000	-	50,000
6	55,000	-	55,000
7	80,000	-	80,000
8	90,000	-	90,000
9	85,000	-	85,000

* In 1975 the company imported a type of industrial sewing machine semifinished, and sold it in Korea. However, this import is not allowed now.

This company believes that current trends in sales will continue for a while. However, the export price is so low that the company still has a hard time in making enough profit with its present productivity and production cost.

V. Problems Perceived by Top Management

Except for the low selling prices in the export market and the irregular quality of incoming materials, this company has few difficulties in sales as well as in purchasing raw materials.

Even with the increased demands from abroad, however, the president of this company says that they are facing a serious cost burden, due mainly to the low productivity of both labor and machines.

Top management considers the following two points to be its most pressing problem:

1) Increasing the rate of production to meet the increased sales orders, and

2) Reducing labor cost by minimizing waste of man-hours and improving labor productivity.

To achieve these goals, top management is trying to take measures as follows:

1) Remove some of the bottleneck operations (three in milling, one in tapping, one in boring, and the thread-hole cleaning operations).

2) Optimize cutting speeds and feeds.

3) Improve the control of production and processes as well as methods.

Furthermore, top management has a plan to invest about $80,000 in purchasing a set of semi-automated machines for arm and bed machining from a company in Japan.

In connection with this investment, they have a plan to introduce a more advanced type of industrial sewing machine for the domestic market.

In both cases above, however, they feel serious difficulties in securing funds and a lack of relevant technology.

VI. Product Information

One type of domestic sewing machine (Model 15K) and a type of industrial sewing machine (Model 103K) are the only products it produces, and both are well known and standardized.

Model 15K constitutes more than 90% of the production volume, on the average, and they sell Model 15K in semifinished form as well as in finished form (about 30% in semifinished form). The semifinished product is a sewing machine with only machining and assembling of the arm and bed completed, without painting.

No design work is done on the products themselves in this company, and drawings and specifications are already available from the beginning. At this point, the company has very few product design problems even without any design engineers.

Figure 1 is a sketch showing the main specifications for the domestic sewing machine, Model 15K.

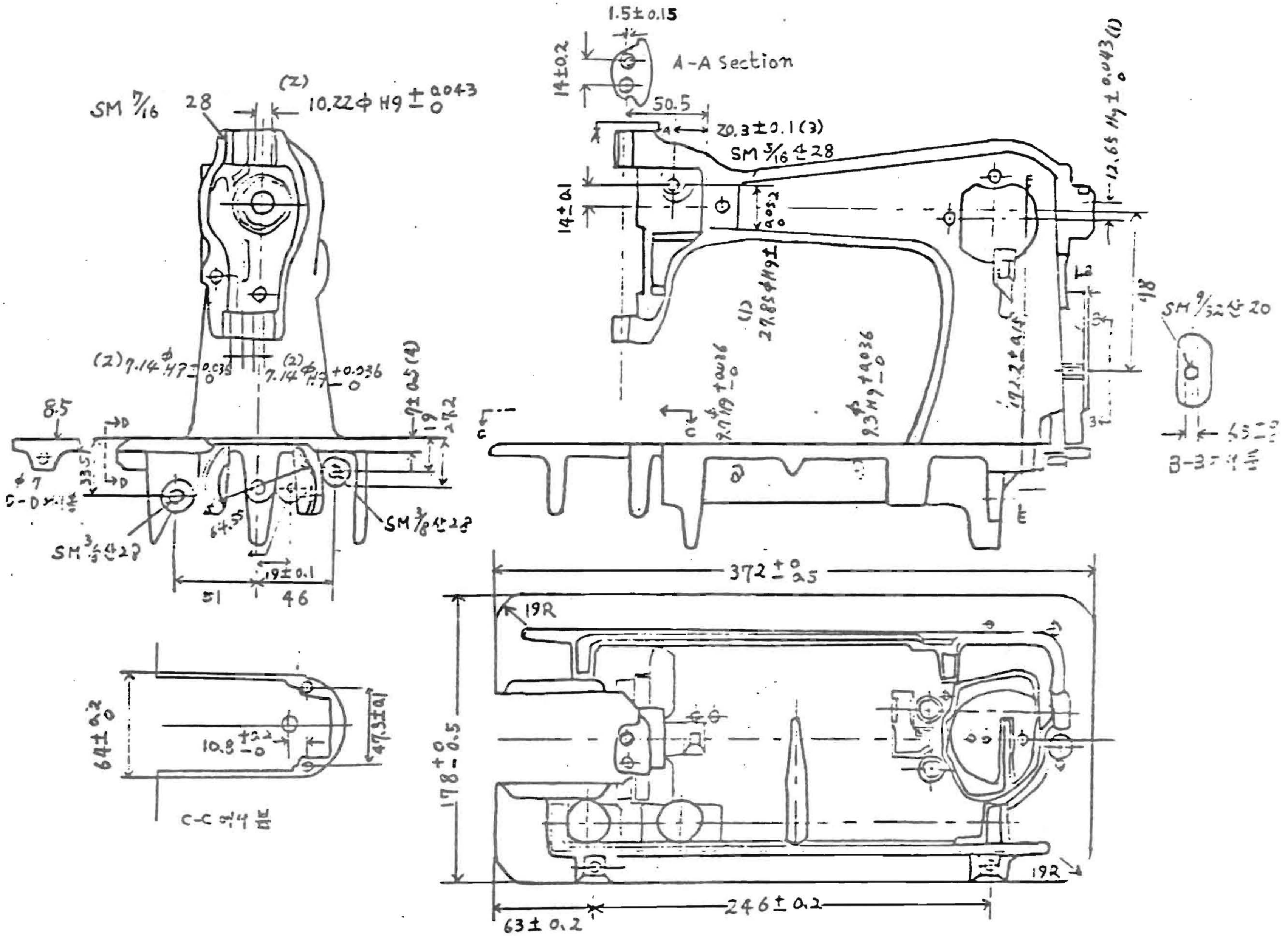
VII. Manufacturing Information

7-1 Purchased Materials and Components.

Iron castings of arm and bed, which are the most important raw materials, bolts and nuts of various sizes, and numerous parts and components except the main shafts and pulleys that are made in the company are

Figure 1

MAIN SPECIFICATIONS OF DOMESTIC SEWING MACHINE (MODEL 15K)



purchased from domestic suppliers. However, a few parts or components are acquired through import from Japan. Except for the unsatisfactory quality of the iron castings, material acquisition has given rise to little trouble up to now.

Figure 2-1 and Figure 2-2 show the sketches for the arm and bed, and their dimensional requirements.

Figure 2-1

IRON CASTINGS OF ARM

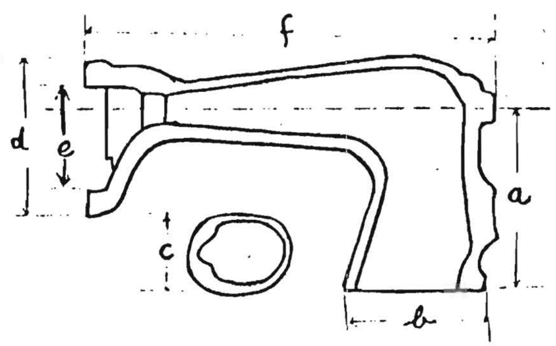
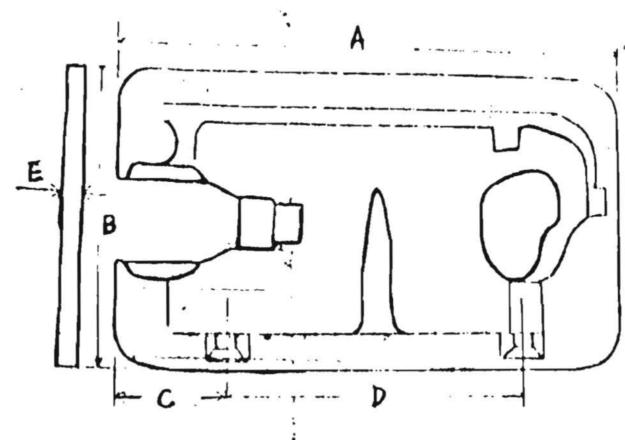


Figure 2-2

IRON CASTINGS OF BED



Symbol	Dimension (mm)	Symbol	Dimension (mm)
a	147± 1	A	376± 1
b	108± 1	B	182± 1
c	93± 1	C	65± 0.5
d	131.5± 1.5	D	246± 1
e	89± 1.5	E	8± 0.5
f	303± 2		

Other specifications are as follows (for both arm and bed)

Material; GC 15 (gray cast iron) in KS-D 4301
Tensile Strength; over 19kg/mm^2
Hardness; 241 HB at most
Deflection; 2.0mm at most
Surface Finish; 70-S in KS-BD161

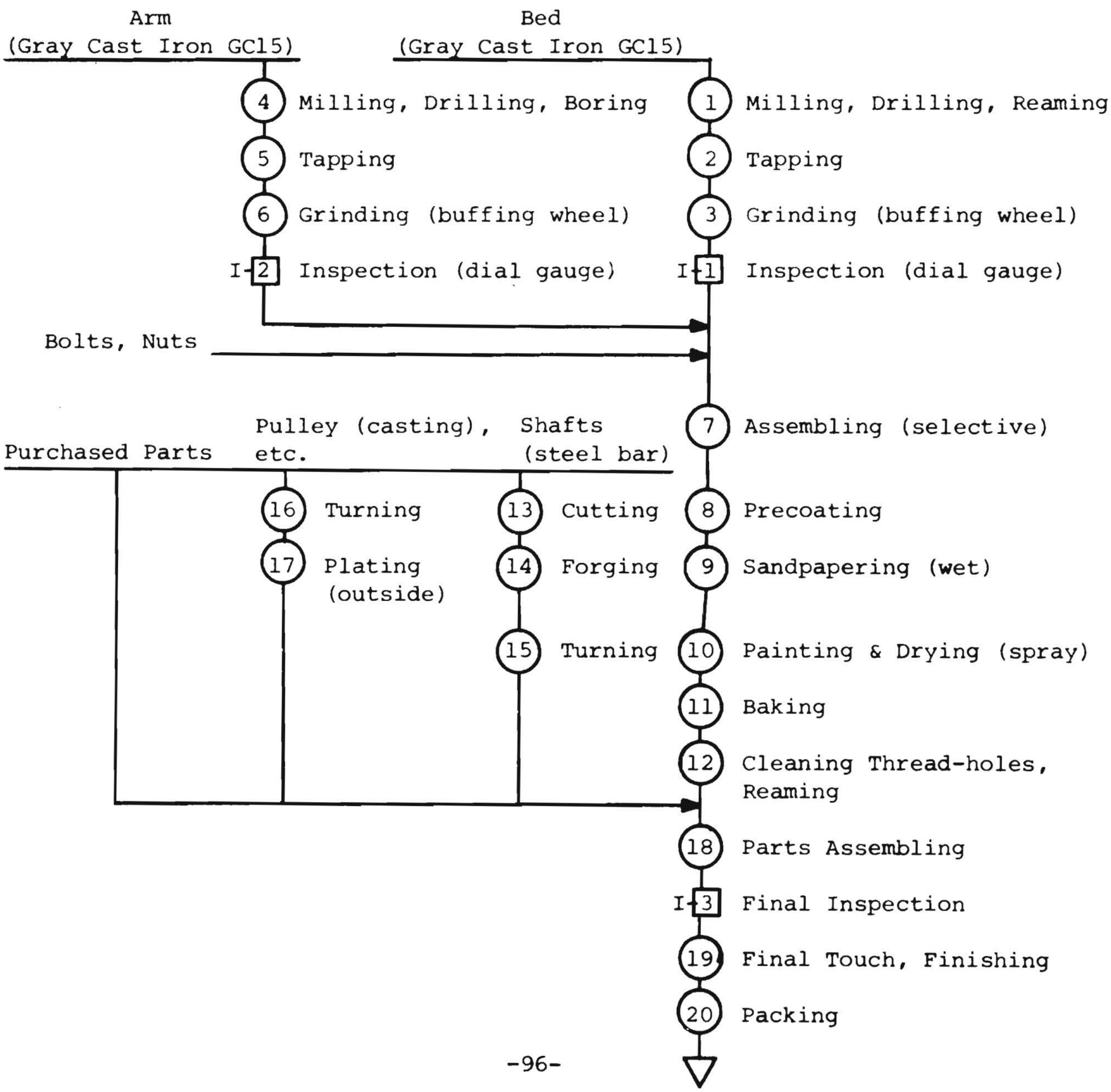
Among the above quality characteristics, hardness, surface finish and some of the physical dimensions are frequently found to be out of control during the manufacturing processes. However, this company relies mostly upon visual inspection, although it had provided a written set of standard practices for the inspection of incoming materials. This company does not have sufficient facilities or testing equipment and has no qualified personnel for this purpose.

7-2 Manufacturing Processes.

From the first milling operation to the final packing, there are more than a hundred separate operations. However, the manufacturing processes can be depicted by an Operation Process Chart, simplified as follows:

Figure 3

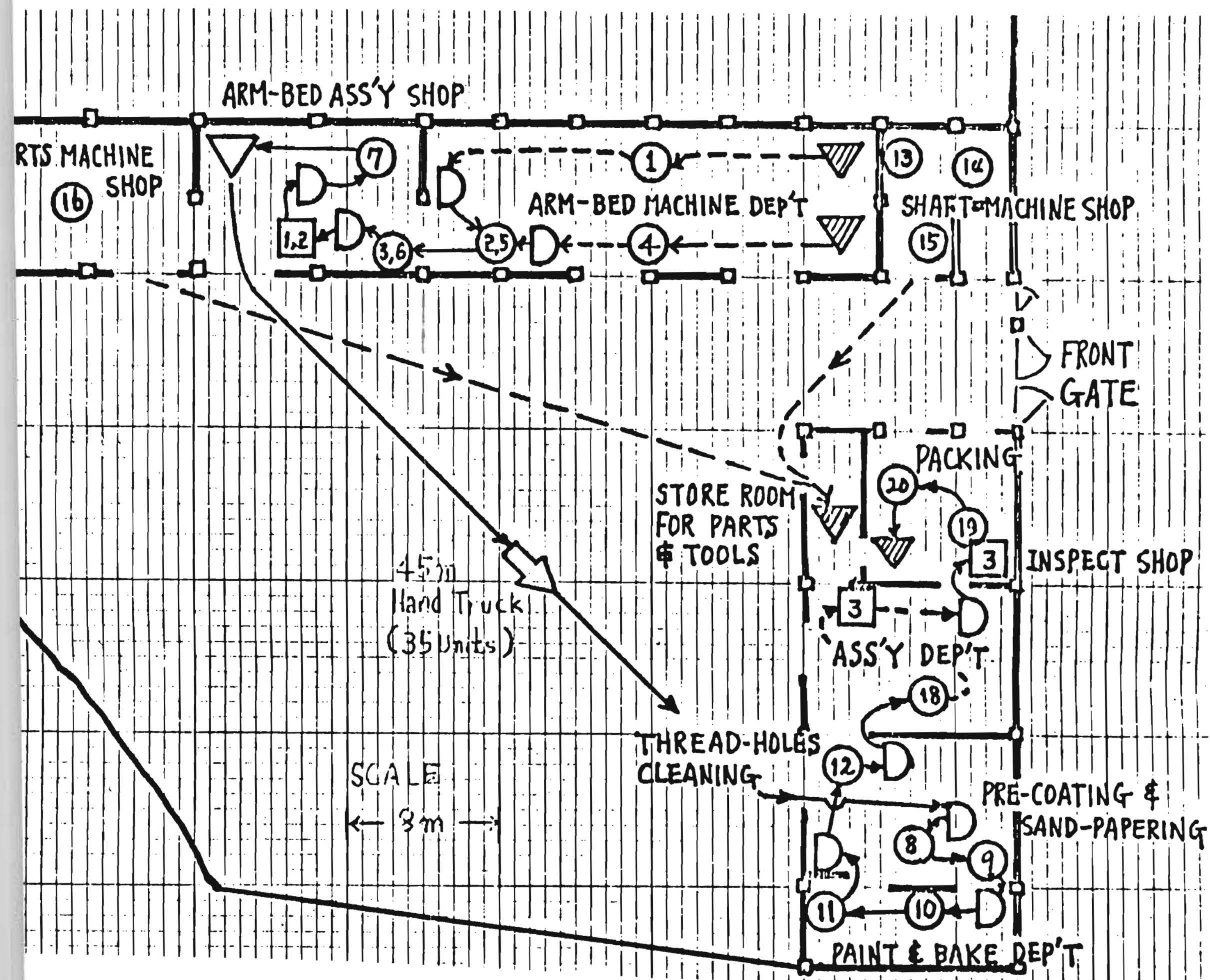
OPERATION PROCESS CHART



The above Operation Process Chart is rearranged below in a flow diagram in order to present a better picture of the manufacturing processes in the whole factory. The flow diagram is self-explanatory and the operation numbers and inspection numbers are the same as those in the operation process chart (Figure 3).

Figure 4

FLOW DIAGRAM

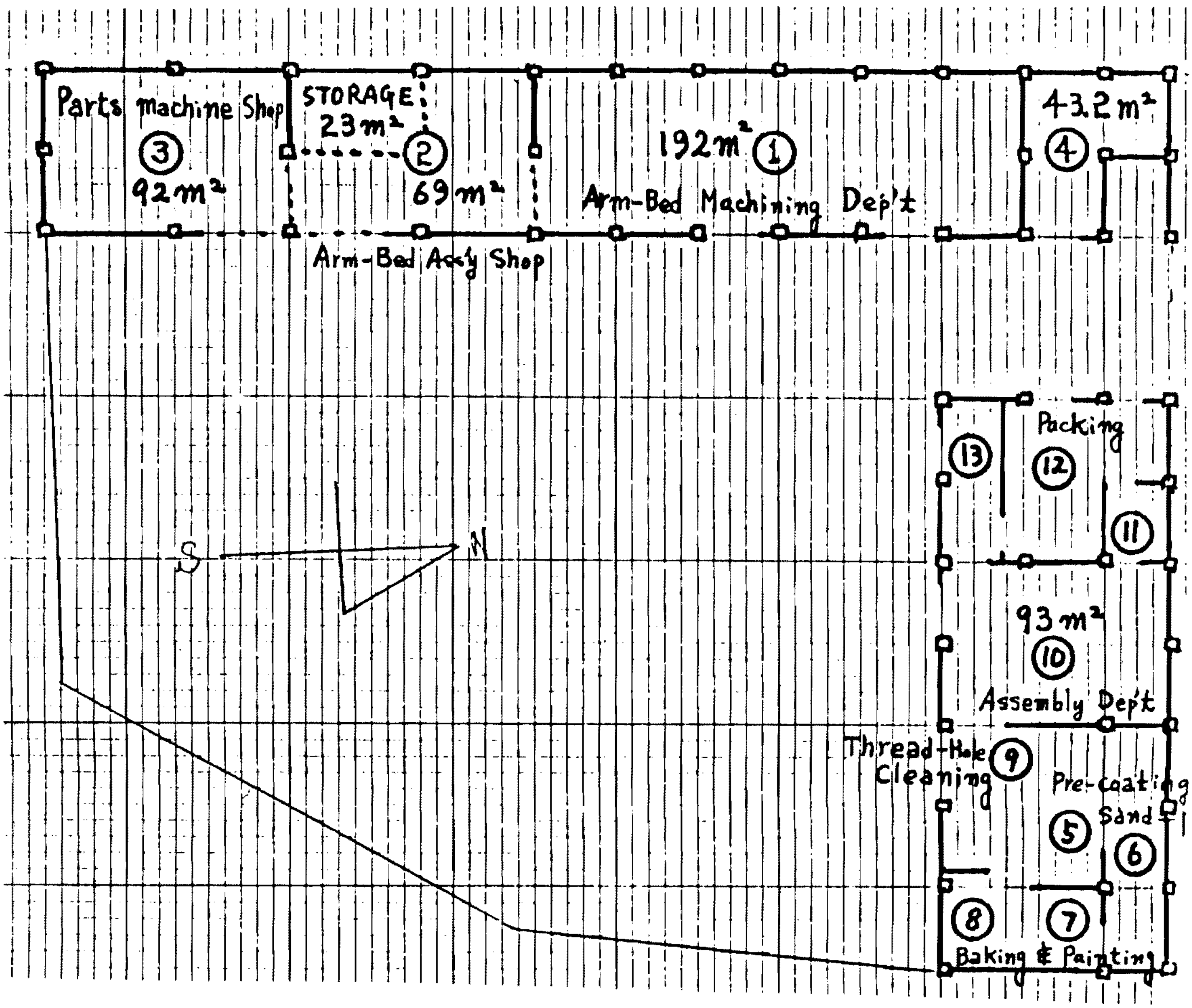


7-3 Manufacturing Facilities.

Total space available for manufacturing is about 745m^2. The overall arrangement of each department is shown in Figure 5.

Figure 5

BUILDING LAYOUT



Key to Figure 5*

1) Arm-Bed Machining Department

Area	:	$192m^2$
Equipment	:	Milling Machine - 20
		Drilling Machine - 22
		Boring Machine - 1
		Reaming Machine - 4
		Tapping Machine - 3

2) Arm-Bed Assembly Shop

Area	:	$92m^2$ ($23m^2$ is reserved and used for storage)
Equipment	:	Buffing Machine - 2
		Grinding Machine - 2
		Milling Machine - 1
		Drilling Machine - 2
		Dial Gauge - 2
		Assembly Table and Tools

3) Parts Machine Shop

Area	:	$92m^2$
Equipment	:	Lathe - 8
		Drilling Machine - 3
		Milling Machine - 2
		Small Press - 2

4) Shaft Machine Shop (leased to an independent vendor)

Area	:	$43.2m^2$
Equipment	:	Lathe - 8
		Forging Facility - 1
		Sawing Machine - 2
		Swing-type Lathe - 2

5), 6) Precoating and Sandpapering Shop

Area	:	$64m^2$
Equipment	:	Precoating Facility - 1 set
		Sandpapering Die (wet process)

7), 8) Painting and Baking Shop

Area	:	$35m^2$
Equipment	:	Spray Painting Facility - 1 set
		Burner (oil) - 2 sets
		Baking Facility - 2 sets

9) Thread-holes Cleaning Shop

Area	:	$40m^2$ (half of the area is used for storage)
Equipment	:	Large Working Table - 1
		Hand Reamer - 3
		Hole Cleaner (manual) - 5

(Continued)

Key to Figure 5* (Continued)

10) Assembly Department

Area : $93m^2$
Equipment : Assembly Facilities
Work Benches
Running Tester - 1 set

11) Inspection Shop

Area : $14m^2$

12) Packing and Storage Area : $52m^2$

13) Parts and Tools Storeroom : $27m^2$

* Most of the machines are a bit specialized and machines are arranged following the manufacturing flow.

Appendix 7

STUDY OF THE UTILIZATION OF SOLAR ENERGY FOR WATER HEATING

STUDY OF THE UTILIZATION OF SOLAR ENERGY FOR WATER HEATING

Introduction

Solar energy is available any place on the earth. Although its energy density is very low, its energy quantity is very large. The major applications of solar energy are in water heating, space heating, refrigeration, and in the generation of electric power.

The purpose of this study is to determine the feasibility of utilizing solar energy for heating water. As a part of Georgia Institute of Technology (GIT) participation in the Small-Scale Industry Grant activities in Korea, Mr. Ed Lewis of the Economic Development Laboratory (EDL) visited Soong Jun University (SJU) during June 1976. During his three-week stay, he designed and supervised the construction of an experimental flat-plate solar collector.

Professor Byong Kyu Choi of the SJU Department of Industrial Engineering was on the GIT campus in Atlanta, Georgia, for three weeks in July 1976 observing and studying the solar energy research being conducted there.

An Experimental Solar Water System

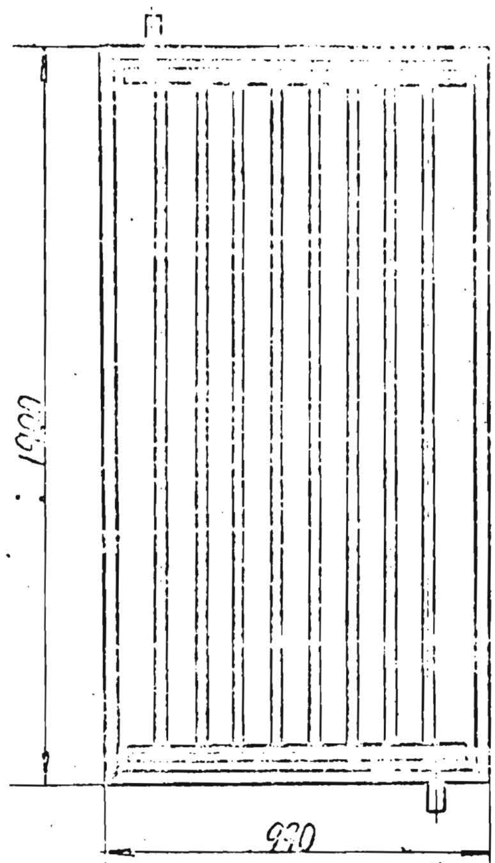
A solar heating system usually consists of a collector, a storage tank, and a load. The system built at SJU consists of a collector and a storage tank, but it has no load. The collector is the most important part of the system. The storage tank stores the solar energy, which can only be collected during daylight hours, thus making the heat available at all hours of the day.

Mr. Lewis designed a flat-plate water heating collector as shown in Figure 1. To improve collector efficiency, he wanted to use square steel tubing with thermal cement to hold the tube to the collector plate. However circular steel tube had to be used, welded to the plate rather than cemented to it, due to the lack of either square steel tubing or thermal cement in the Seoul area. Table 1 gives the specifications of the collector as it was built.

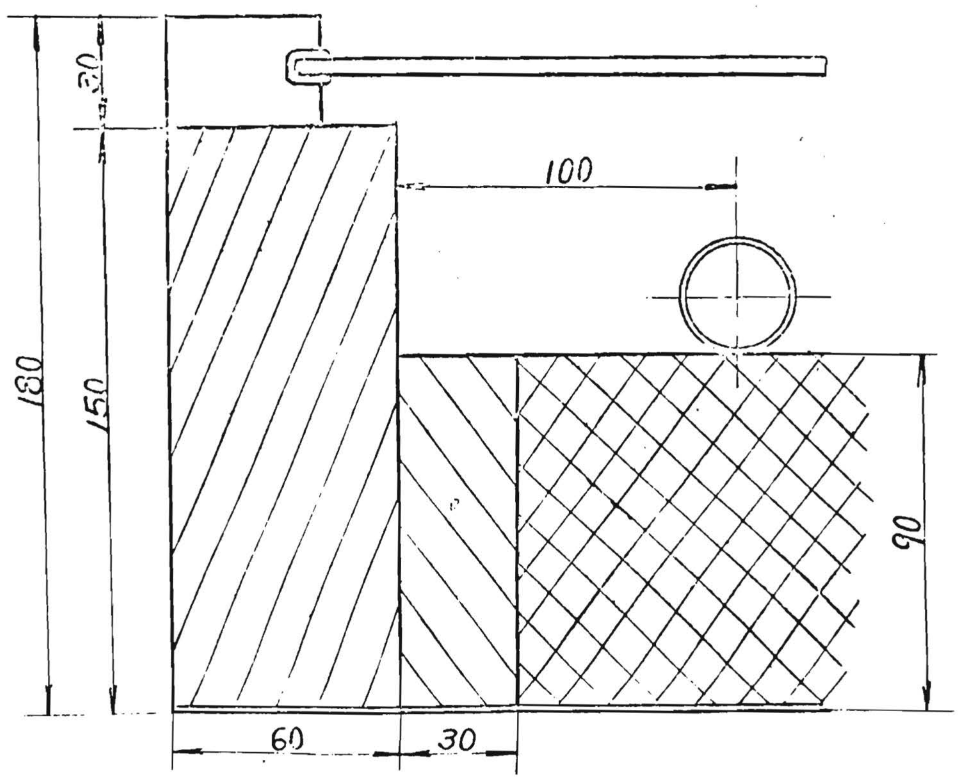
Water was used as the working substance for the energy transfer. Although natural convection is sometimes used for circulating the water, a forced convection system using an electrically powered 1/10 horsepower circulating water pump was installed in this unit. A 50-gallon drum was used as the storage tank. The collector was designed to be adjustable in order to determine the optimum

Figure 1

COLLECTOR



(a) Plane View of Collector



(b) Cross-Section View of Collector

Table 1

SPECIFICATIONS OF THE SOLAR COLLECTOR

Solar incidence area	1.62 m
Coating of panel surface	Black paint
Diameter of tube	1 inch
Number of tubes	8
Distance between tubes	10 cm
Thickness of panel	3.2 mm
Thickness of glass plate	5 mm
Height between panel and glass plate	7 cm
Material of frame	Wood
Material of insulation	Styrofoam and glass wool
Material of panel	Steel plate
Thickness of steel plate	2 mm

inclination of the collector. The initial inclination of the collector was set at 48° from horizontal and the unit was faced due south.

The piping and storage tank were insulated with styrofoam and glass wool. Piping is PVC hose of 1¼-inch diameter. The entire unit was installed on a wheeled cart to allow it to be easily moved from place to place. Twenty-two gauge Cu-Co thermocouples are used for measuring the temperatures. These are installed in three places on the steel plate collector, on the entrance and exit tubes of the collector, at three points on the storage tank, and a ninth is utilized for the measurement of the ambient temperature. The storage tank contains 180 liters of water. During the colder months, the unit is filled with a 5% solution of antifreeze to prevent damage from freezing. Figure 2 presents a schematic diagram of the unit.

Experimental Results

Figure 3 presents the observed results from a typical day in September of 1976, with a reading taken every hour from 10:00 hours to 16:00 hours each day. Figure 4 gives comparable data for a typical day in October 1976.

To date the incidence and orientation have remained as originally set: 48° from horizontal and headed due south. Future plans call for experiments varying either or both the inclination and heading.

Table 2 presents data on collected solar energy, the maximum temperature of the water in the storage tank, and the average ambient temperature for the period between 10:00 and 16:00 hours.

Expenses

The cost of the materials which went into this solar unit totaled 200,000 ₩, including the cost of the cart. Exclusive of the cart, the unit cost 150,000 ₩; or 92,600 ₩/m^2. At an exchange rate of 448 ₩/$, the cost of the unit less cart would be US$206.70/$m^2$.

Figure 2

SCHEMATIC DIAGRAM OF SOLAR COLLECTOR

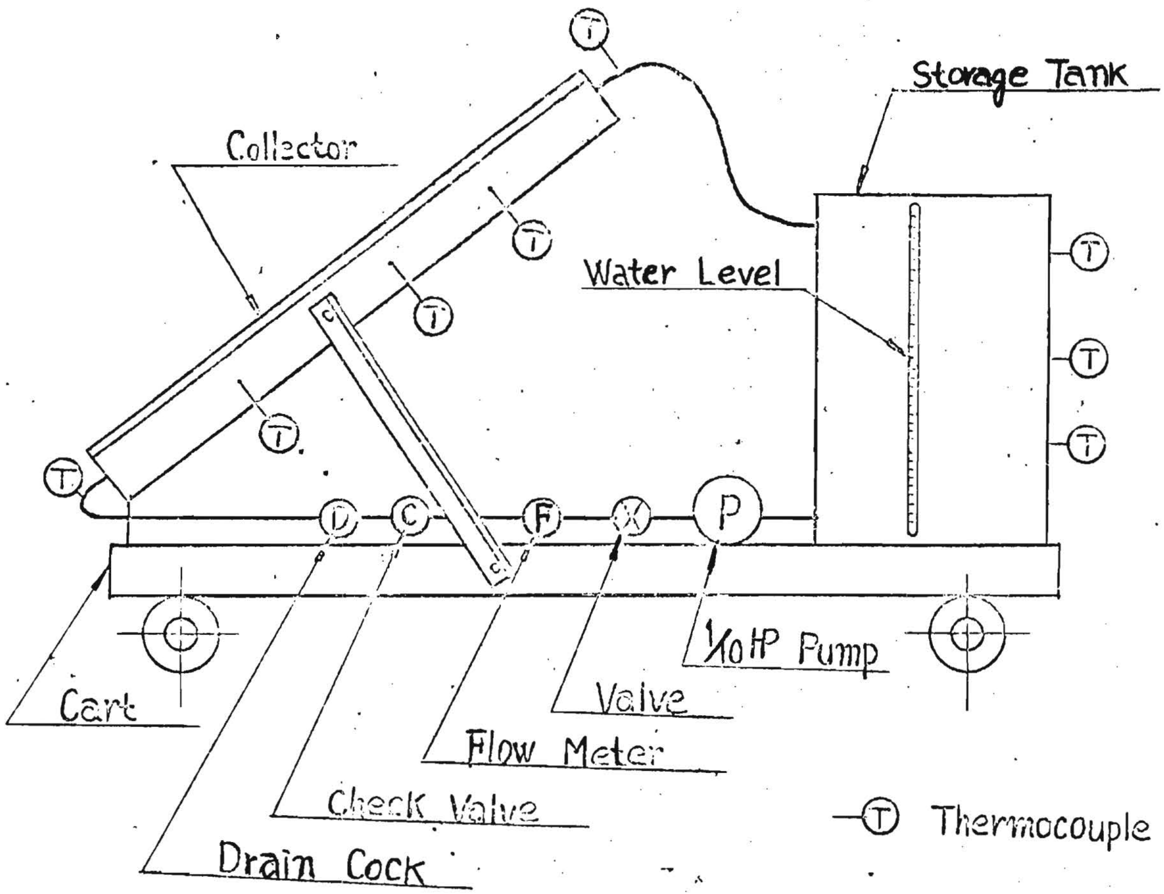


Figure 3

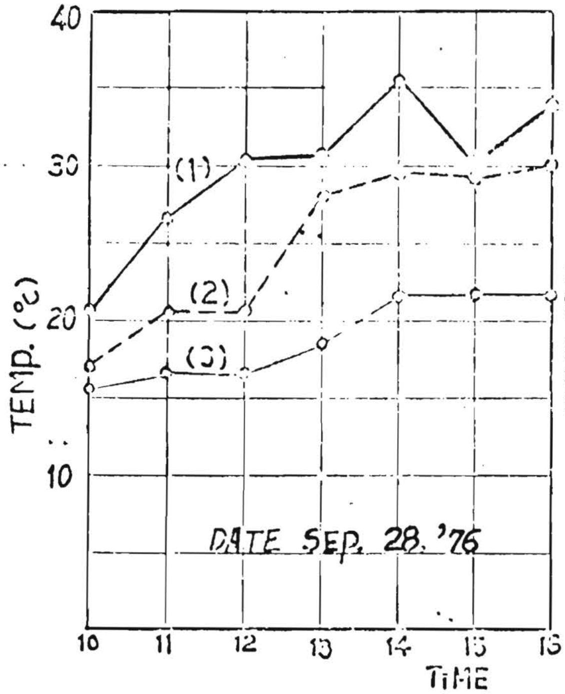
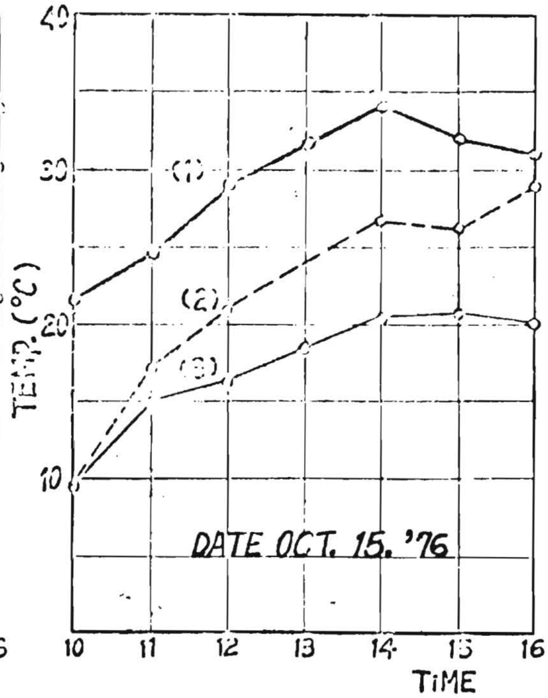


Figure 4



(1) Collector Surface Temp.

(2) Storage Tank Temp.

(3) Ambient Temp.

Table 2

	SEP. 28	OCT. 15
Collected Solar Energy	1400 kcal/day·m²	2133 Kcal/day·m²
Max. Temp. of Water	30°C	29°C
Ave. Ambient Temp.	19°C	17°C